# AR TARGET SHEET

The following document was too large to scan as one unit; therefore, it has been broken down into sections.

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| DOCUMENT# | WA7890008967 |
| TITLE | Dangerous Waste Portion of RCRA Permit for Treatment Storage and Disposal of Dangerous Waste (Part 2 of 2) |
| EDMC# | 0054507 |
| SECTION | 4 of 5 |

# Hanford Facility RCRA Permit Modification

## List of Attachments
## Attachment 4, Hanford Emergency Management Plan

Replacement Sections

## Index

Section 4

Appendix A

# 4.0 EVENT CATEGORIZATION AND CLASSIFICATION

Categorization and classification of events is key to ensuring that appropriate notifications and response actions are promptly initiated. Event categorization and classification criteria are developed and maintained to include events that require similar actions. The spectrum of actions triggered by categorization range from management activities that are not required to be initialized until after an event is closed out (i.e., occurrence reporting), to full activation of onsite and offsite emergency response organizations.

At the Hanford Site, five event categories are used to meet the requirements of DOE Orders, state and Federal regulations, and mutual agreements between RL and state and county agencies. Events may meet the criteria of one or more category; therefore, a sequential event evaluation process prioritized according to the time urgency of the required actions is employed. The five event categories used at Hanford are: Operational Emergencies, RCRA Emergencies, Abnormal Events, Unusual Occurrences, and Off-Normal Occurrences.

This section describes the provisions that shall be established and maintained as methods to be used to recognize, categorize, and classify events in order to protect workers, the public, and the environment. The Unusual and Off-normal Occurrence categories are used solely for occurrence reporting purposes, which is delineated in the Hanford implementing directive HFID 232.1B, *Notification, Reporting, and Processing of Operations Information*, and, therefore, will not be addressed further in this plan.

## 4.1 OPERATIONAL EMERGENCY

Operational Emergencies are unplanned, significant events or conditions that require time-urgent response from outside the immediate/affected facility or area of the incident. Operational Emergencies are divided into Base Program Operational Emergencies or Hazardous Material Operational Emergencies. Such emergencies are caused by, involve, or affect DOE facilities or activities and represent, cause, or have the potential to cause the events or conditions described in the respective subsections below. Incidents that can be controlled by employees or maintenance personnel in the immediate/affected facility or area are not Operational Emergencies. Incidents that do not pose a significant hazard to safety, health, and/or the environment and that do not require a time-urgent response are not Operational Emergencies. Initiating events that warrant categorization as Operational Emergencies shall be included in site- and facility-specific procedures.

Emergencies, once categorized, shall not be downgraded. An event determined to be an emergency will remain so until the emergency response is terminated.

RL/ORP shall determine the criteria to be used to categorize and classify Operational Emergencies based on site-specific criteria. Additional criteria may be based on the DOE *Emergency Management Guide* (DOE 1997). Site contractors shall maintain procedures to ensure recognition and appropriate categorization and classification of emergencies.

### 4.1.1 Base Program Operational Emergency

A Base Program Operational Emergency shall be declared when events occur that represent a significant degradation in the level of safety at a facility and that require time-urgent response efforts from outside the facility but do not involve the release or potential release of significant quantities of radiological or nonradiological materials. Since Base Program Operational Emergencies do not involve the release of significant quantities of hazardous materials, they do not require further classification (i.e., as Alert, Site Area Emergency, or General Emergency).

The designated point-of contact (e.g., BED/BW, contractor single point-of-contact), with assistance from ONC personnel will assess event information to determine if the event should be categorized as a Base Program Operational Emergency. The criteria for categorization of a Base Program Operational Emergency is part of the Abnormal Event criteria which is contained as a single criteria list within Hanford implementing directive HFID 232.1B, *Notification, Reporting, and Processing of Operations Information.*

Additionally, offsite transportation events involving RL/ORP-owned hazardous materials are categorized as Base Program Operational Emergencies and, as such, do not require classification.

### 4.1.2 Hazardous Material Operational Emergency

If an Operational Emergency represents a specific threat to workers and the public due to the release or potential release of significant quantities of radiological and nonradiological hazardous materials, it shall be classified as either an Alert, Site Area Emergency, or General Emergency, in order of increasing severity.

For facility events, the initial event classification shall be made by the BED or IC in accordance with established procedures.

For nonfacility events (e.g., transportation events, wildland fires), the initial event classification shall be made by the on-call Emergency Duty Officer.

The emergency classification shall be reviewed periodically to ensure the classification is commensurate with response activities; however, the classification shall not be downgraded until termination of the event. The criteria used to recognize and classify emergencies, called emergency action levels (EALs), are delineated in subsection 4.4. Hazardous Material Operational Emergency notification requirements are delineated in subsection 5.1.1.2.

**4.1.2.1 Alert.** An Alert shall be declared when events are predicted, are in progress, or have occurred that result in either of the following.

(1) An actual or potential substantial degradation in the level of control over hazardous materials (radiological and nonradiological). The radiation dose from any release to the environment of radioactive material or a concentration in air of other hazardous material is expected to be limited to a fraction of the applicable Protective Action Guide (PAG) or Emergency Response Planning Guideline (ERPG) at the facility boundary; but it is not expected that the applicable PAG or ERPG will be exceeded at or beyond the facility boundary. (See Table 4-2 for specific PAG and ERPG exposure levels.)

(2) An actual or potential substantial degradation in the level of safety or security of a facility or activity that could, with further degradation, produce a Site Area Emergency or General Emergency.

Additionally, an Alert represents an event where the entire Hanford Site ERO is required to provide more than event monitoring or minimal assistance to the facility organization.

At an Alert, the Hanford Site ERO shall:

- activate the DOE Hanford EOC and establish communications, consultation, and liaison with offsite agencies;
- continuously assess pertinent information for DOE decision makers, offsite agencies, the public, and other appropriate entities;
- conduct appropriate assessments, investigations, or preliminary sampling and monitoring;
- mitigate the severity of the occurrence or its consequences; and
- prepare for other response actions should the situation become more serious, requiring emergency response organizations to mobilize or activate resources.

**4.1.2.2 Site Area Emergency.** A Site Area Emergency shall be declared when events are predicted, in progress, or have occurred that result in either of the following situations.

(1) An actual or potential major failure of functions necessary for the protection of workers or the public. The radiation dose from any release of radioactive material or concentration in air from any release of other hazardous material is expected to be equal to or exceed the applicable PAG or ERPG exposure levels at the facility boundary but is not expected to be exceeded at or beyond the Hanford Site boundary. (See Table 4-2 for specific PAG and ERPG exposure levels. Refer to site boundary definition in subsection 1.4.2.)

(2) Actual or potential major degradation in the level of safety or security of a facility or process that could, with further degradation, produce a General Emergency.

At a Site Area Emergency, the Hanford Site ERO shall perform the same response actions as for an Alert plus the:

- initiation of predetermined protective actions for onsite personnel;
- provision of information to the public and the media;
- implementation of or assistance in any evacuations and sheltering; and
- mobilization of appropriate emergency response groups or protective/security forces for immediate dispatch should the situation become more serious.

**4.1.2.3 General Emergency.** A General Emergency shall be declared when events are predicted, in progress, or have occurred that result in the actual or imminent catastrophic reduction of facility safety or security systems with potential for the release of large quantities of hazardous materials (radiological or nonradiological) to the environment. The radiation dose from any release of radioactive material or a concentration in air from any release of other hazardous material is expected to be equal to or exceed the applicable PAG or ERPG exposure levels at or beyond the Hanford Site boundary. (See Table 4-2 for specific PAG and ERPG exposure levels. Refer to site boundary definition in subsection 1.4.2.)

At a General Emergency, the Hanford Site ERO shall perform the same response actions as for a Site Area Emergency plus the notification, mobilization, and dispatch of appropriate emergency response personnel and equipment, including appropriate DOE emergency response assets, and liaison with offsite agencies for the recommendation of predetermined public protective actions.

Operational Emergency notification requirements are delineated in respective subsections of section 5.0.

## 4.2 RESOURCE CONSERVATION AND RECOVERY ACT EMERGENCY

A RCRA emergency is defined as a release, fire, or explosion that could threaten human health or the environment. For a facility event, the BED/BW/IC, in consultation with the respective site contractor environmental single point-of-contact, shall determine whether the incident is a RCRA emergency based upon an evaluation and assessment. It is the responsibility of the BED/BW/IC to make this determination even though the BED/BW/IC consults with the site contractor environmental single point-of-contact. When this determination occurs, notifications delineated in subsection 5.1.2.1 shall be performed. Notifications described in subsection 5.1.1 may also be required for a RCRA emergency and are determined on a case-by-case basis by the BED/BW/IC.

The BED/BW/IC ensures that trained personnel identify the character, source, amount, and areal extent of the release, fire, or explosion to the extent possible. Identification of waste can be made by activities that can include, but are not limited to, visual inspection of involved containers, sampling activities in the field, reference to inventory records, or by consulting with facility personnel. Samples of materials involved in an emergency might be taken by qualified personnel and analyzed as appropriate. These activities must be performed with a sense of immediacy and shall include available information.

After gathering appropriate event information, the hazards posed by the event to human health and the environment must be assessed. The assessment must take into consideration the direct, indirect, immediate, and long-term effects of the incident. The assessment should include sources such as Material Safety Data Sheet toxicity and health information and results from any personnel monitoring examinations conducted at medical facilities. These are the types of tools, which will aid in ascertaining the extent in which human health and the environment were threatened.

If assessment of all available information does not yield a definitive assessment of the danger posed by the incident, a worst-case condition will be presumed and appropriate protective actions and notifications will be initiated. The BED/BW/IC is responsible to initiate any protective actions based on their best judgement of the incident.

For onsite transportation events, it is the responsibility of the on-call EDO, in consultation with the FHI site contractor environmental single point-of-contact, to make the determination whether the incident is a RCRA emergency. A RCRA emergency for onsite transportation events is defined as a release of WAC hazardous substances that threatens human health or the environment. When this determination occurs, notifications delineated in subsection 5.1.2.1 shall be performed. Notifications described in subsection 5.1.1 may also be required for a RCRA emergency and are determined on a case-by-case basis by the EDO.

## 4.3 ABNORMAL EVENT

There are a variety of events or situations that may occur on the Hanford Site that, while not creating or indicating an emergency condition, may generate public concern or media interest. Local, state, and tribal agencies need timely information regarding these events in order to reassure the public that these situations do not threaten their health or safety.

RL will work with offsite agencies to maintain criteria that will be used to identify these situations, termed Abnormal Event. The criteria will include those events as mutually agreed to by RL/ORP and the offsite agencies. Additionally, any incident categorized as an Operational Emergency, but not further classified as an Alert, Site Area Emergency, or General Emergency, will automatically trigger notifications to offsite agencies as an Abnormal Event. RL/ORP will further communicate criteria changes to the site contractors upon acceptance by RL/ORP and the offsite agencies.

## 4.4 EMERGENCY ACTION LEVELS

The EALs are specific, predetermined, observable criteria used to detect, recognize, and determine the classification of Hazardous Material Operational Emergencies identified by the hazards assessment. The EALs are typically identified as either event-based or symptom-based. The distinction arises from the available methods of detecting and recognizing the initiating conditions of the event. The development of symptom-based EALs is the preferred approach recognizing that there will usually be some initiating conditions that require an event-based approach. Initiating conditions must be identified specifically in EAL procedures and must be observable and recognizable in a timely manner by responsible personnel.

Facility-specific and nonfacility (e.g., onsite transportation incident, wildland fire, etc.) EALs shall be developed for the spectrum of potential Hazardous Material Operational Emergencies identified by the hazards assessment. Additional guidance for developing EALs can be found in the DOE *Emergency Management Guide* (DOE 1997) regarding hazards assessment and event classification.

The definitions delineated in Table 4-1, used in conjunction with Table 4-2, depict the criteria used at the Hanford Site to classify Hazardous Material Operational Emergency events. The BED/IC or EDO (for nonfacility events) is responsible for making initial classification of emergency events in accordance with RL/ORP and site contractor procedures.

Event classification using EALs also forms the basis for notification and participation of offsite organizations and for determining what and when protective actions will be implemented. As such, EALs and related information must be consistent and integrated with the emergency plans and procedures of offsite Federal, tribal, state, and local organizations and should be reviewed annually, as appropriate by all parties involved in response activities.

### 4.4.1 Symptom-Based Emergency Action Levels

Symptom-based EALs are dependent on one or more observable conditions or parameter values (i.e., symptoms) that are measurable over some continuous spectrum. The EALs should be the same indicators as those used to monitor routine facility operation. The level of severity indicated by these symptoms is directly related to the failure of or challenge to the facility's hazardous materials confinement barriers, other symptoms or events that occur simultaneously, and the ability of personnel to gain control and bring the indicator(s) back to safe levels. The resulting facility-specific EALs shall consist of specific quantified values (e.g., alarms and control instrument readings) that require no additional interpretation by the user. By comparing the observed value to the EALs in event classification procedures, the correct Hazardous Material Operational Emergency class can be readily determined.

### 4.4.2 Event-Based Emergency Action Levels

Event-based EALs address the occurrence of discrete events with potential safety significance. The level of severity is determined by the degree to which hazardous material confinement barriers are either failed or challenged as a result of the event, and the ability of personnel to gain control of the situation. Event classification requires the interpretation of one or more qualitative conditions or discrete observable indicators to determine if the existing situation matches the descriptions contained in the event classification procedure.

### 4.4.3 Emergency Action Level Development

The methodology for development of Hanford Site EALs is described in the following steps.

Step 1: Using the hazards assessment as the technical basis, identify the accident scenarios and consequences.

Step 2: Identify initiating conditions, barrier failures, system failures, contributing events and accident mechanisms for the scenario.

Step 3: Use the information developed in step 2 to identify specific equipment or other methods of detection.

Step 4: For detection and recognition methods that correlate directly to consequences, specific values for each emergency class are developed as necessary. These are symptom-based EALs.

Step 5: If there are no readily available methods to confirm a release, but the situation has the potential to exceed emergency criteria, the recognition of the event becomes the EAL. These are event-based EALs.

### 4.4.4 Use of Emergency Action Levels

On determination that an event has occurred at or affecting a Hanford Site facility, the BED/IC or EDO (for nonfacility events) shall promptly assess the conditions, compare the indications to the EAL set, and determine the appropriate Hazardous Material Operational Emergency classification. Then, immediate protective and mitigative actions, activation of the emergency response organization, and appropriate notifications are carried out.

The DOE Hanford EOC is responsible for ensuring that the emergency has been classified appropriately by the BED/IC or EDO (for nonfacility events) by reviewing the appropriate EAL to determine that the correct emergency classification has been selected.

**Table 4-1. Summary of Hazardous Material Operational Emergency Classifications.**

| OPERATIONAL EMERGENCY CLASSIFICATION | FACILITY OR PROCESS EVENT | ONSITE TRANSPORTATION EVENT |
|---|---|---|
| Alert | Actual or potential substantial degradation of level of control over radiological or nonradiological hazardous material. Releases are not expected to exceed applicable PAG or ERPG levels at or beyond the facility boundary.<br>OR<br>Actual or potential substantial degradation in the level of safety or security that could, with further degradation, produce a Site Area Emergency or General Emergency. | Actual or potential substantial degradation of the safety of the shipment. Exposures in excess of PAG or ERPG levels only expected for personnel engaged in cleanup, recovery and investigation. |
| Site Area Emergency | Actual or potential major failures of functions necessary for the protection of workers or the public. Releases could exceed applicable PAG or ERPG levels onsite but not offsite.<br>OR<br>Actual or potential major degradation in the level of safety or security that could, with further degradation, produce a General Emergency. | Actual or potential major reduction in safety of a shipment. Release may exceed PAG or ERPG levels beyond the exclusion zone[1] onsite but not at nearest site boundary. |
| General Emergency | Actual or imminent catastrophic reduction of facility safety or security systems with potential for the release of large quantities of radiological or nonradiological materials to the environment. Releases reasonably expected to exceed applicable PAG or ERPG levels offsite. | Actual or imminent catastrophic reduction in safety of a shipment. Release expected to exceed PAG or ERPG levels offsite. |

[1] The exclusion zone is defined as the immediate vicinity of the accident.

**Table 4-2. Hanford Site Hazardous Material Operational Emergency Classification Criteria.**

| ALERT | SITE AREA EMERGENCY | GENERAL EMERGENCY |
|---|---|---|
| ≥ ERPG[1]-1 & < ERPG-2 at the facility boundary[2]. | ≥ ERPG-2 at the facility boundary. | ≥ ERPG-2 at the Hanford Site boundary. |
| ≥ 100 mrem TEDE[3] at the facility boundary. | ≥ 1 rem TEDE at the facility boundary. | ≥ 1 rem TEDE at the Hanford Site boundary. |

[1] Appropriate ERPG values or equivalent as stated in the DOE *Emergency Management Guide*. Solubility class "D" uranium compounds are limited by chemical toxicity.

[2] The facility boundary is defined as the property protection area perimeter fence when present or a distance of 100 meters from the release location unless otherwise specified in the hazards assessment documentation.

[3] The total effective dose equivalent (TEDE) includes the summation of the doses delivered from plume submersion, ground shine, and inhalation from accidental releases.

# APPENDIX A
# DOCUMENTATION CROSSWALK MATRIX

| REQUIREMENT SOURCE | REQUIREMENT DESCRIPTION | HOW DOES REQUIREMENT APPLY TO HANFORD? | WHERE IS REQUIREMENT MET IN OCUMENTATION? |
|---|---|---|---|
| WAC 173-303-340<br><br>Introduction | Preparedness and prevention. Facilities must be designed, constructed, maintained, and operated to minimize the possibility of fire, explosion, or any unplanned sudden or nonsudden release of dangerous waste or dangerous waste constituents to air, soil, or surface or ground water, which could threaten the public health or the environment. This section describes preparations and preventive measures, which help avoid or mitigate such situations. | Under the Dangerous Waste Regulations (State authorized RCRA program), the Hanford Site is a singular facility with over 60 TSD units and many more locations where generator activities take place. For the purposes of these regulations: Facility = Hanford Site | N/A |
| WAC 173-303-340(1)<br><br>(Permit requirement) | Required equipment. Required equipment. All facilities must be equipped with the following, unless it can be demonstrated to the department that none of the hazards posed by waste handled at the facility could require a particular kind of equipment specified below: (a) An internal communications or alarm system capable of providing immediate emergency instruction to facility personnel; (b) A device, such as a telephone or a hand-held, two-way radio, capable of summoning emergency assistance from local police departments, fire departments, or state or local emergency response teams; (c) Portable fire extinguishers, fire control equipment (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals), spill control equipment, and decontamination equipment; and (d) Water at adequate volume and pressure to supply water hose streams, foam producing equipment, automatic sprinklers, or water spray systems. All facility communications or alarm systems, fire protection equipment, spill control equipment, and decontamination equipment, where required, must be tested and maintained as necessary to assure its proper operation in time of emergency. | Required equipment is evaluated on a site-wide basis (Hanford Fire Department) and a location-specific basis for TSD units and 90-day accumulation areas. Each location does not necessarily require each type of equipment. Lists of appropriate equipment are documented in accordance with WAC 173-303-350(3)(e). | See line item for WAC 173-303-350(3)(e). |
| WAC 173-303-340(2)<br><br>(Permit requirement) | Access to communications or alarms. Personnel must have immediate access to the signaling devices described in the situations below: (a) Whenever dangerous waste is being poured, mixed, spread, or otherwise handled, all personnel involved must have immediate access to an internal alarm or emergency communication device, either directly or through visual or voice contact with another employee, unless such a device is not required in subsection (1) of this section; (b) If there is ever just one employee on the premises while the facility is operating, he must have immediate access to a device, such as a telephone or a hand-held, two-way radio, capable of summoning external emergency assistance, unless such a device is not required in subsection (1) of this section. | Site personnel are provided access to signaling devices. | None required to document compliance. |
| WAC 173-303-340(3)<br><br>(Permit requirement) | Aisle space. The owner or operator must maintain aisle space to allow the unobstructed movement of personnel. fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency, unless it can be demonstrated to the department that aisle space is not needed for any of these purposes. | This requirement is met at TSD units and 90-day accumulation area, where appropriate. | N/A |

| REQUIREMENT SOURCE | REQUIREMENT DESCRIPTION | HOW DOES REQUIREMENT APPLY TO HANFORD? | WHERE IS REQUIREMENT MET IN OCUMENTATION? |
|---|---|---|---|
| WAC 173-303-340(4)<br><br>(Permit requirement) | Arrangements with local authorities. The owner or operator must attempt to make the following arrangements, as appropriate for the type of waste handled at his facility and the potential need for the services of these organizations, unless the hazards posed by wastes handled at the facility would not require these arrangements: (a) Arrangements to familiarize police, fire departments, and emergency response teams with the layout of the facility, properties of dangerous waste handled at the facility and associated hazards, places where facility personnel would normally be working, entrances to roads inside the facility, and possible evacuation routes; (b) Arrangements to familiarize local hospitals with the properties of dangerous waste handled at the facility and the types of injuries or illnesses which could result from fires, explosions, or releases at the facility; (c) Agreements with state emergency response teams, emergency response contractors, and equipment suppliers; and (d) Where more than one party might respond to an emergency, agreements designating primary emergency authority and agreements with any others to provide support to the primary emergency authority. | Arrangements are addressed on a site-wide basis. Memoranda of Understanding, which RL enters into, are described in DOE/RL-94-02, Table 3-1.<br><br>Hanford Site emergency responders (Hanford Fire Department and Hanford Patrol) must be familiar with items - 340(4)(a). The City of Richland, Benton County Sheriff and Washington State Patrol will be familiar as necessary. | See line item for WAC 173-303-350(3)(c). |
| WAC 173-303-340(5) | Where state or local authorities decline to enter into such agreements, the owner or operator must document the refusal in the operating record. | The operating record is the set of documents maintained to demonstrate compliance with WAC 173-303 and the Hanford Site RCRA Permit. | None. If authorities decline, the documentation will be maintained in accordance with DOE/RL-91-28. |
| WAC 173-303-350(1) | Purpose. The purpose of this section and WAC 173-303-360 is to lessen the potential impact on the public health and the environment in the event of an emergency circumstance, including a fire, explosion, or unplanned sudden or nonsudden release of dangerous waste or dangerous waste constituents to air, soil, surface water, or ground water by a facility. A contingency plan must be developed to lessen the potential impacts of such emergency circumstances, and the plan must be implemented immediately in such emergency circumstances. | DOE/RL-94-02 is the site-wide plan meeting site-wide contingency planning requirements. Location-specific/activity-specific elements are contained in documentation for operating TSD units and 90-day accumulation areas. | The contingency plan consists of portions of DOE/RL-94-02 and location-specific/activity-specific documentation. |
| WAC 173-303-350(2) | Each owner or operator must have a contingency plan at his facility. A contingency plan must be developed to lessen the potential impacts of such emergency circumstances, and the plan must be implemented immediately in such emergency circumstances. | Facility = Hanford Site according to the regulations. (See section 1.4.1 of this plan for definition.) | The contingency plan consists of portions of DOE/RL-94-02 and location-specific/activity-specific documentation. |
| WAC 173-303-350(3)(a)<br><br>(Permit requirement) | The contingency plan must contain the following: (a) A description of the actions which facility personnel must take to comply with this section and WAC 173-303-360; | The site-level description of actions is addressed in this plan. Location-specific/activity-specific documentation utilizes generic response descriptions or creates more detailed descriptions appropriate for the location. | Site-level: DOE/RL-94-02, section 1.3.4.<br><br>Unit-level: location-specific documentation. |
| WAC 173-303-350(3)(b)<br><br>(Permit requirement) | The contingency plan must contain the following: (b) A description of the actions which will be taken in the event that a dangerous waste shipment, which is damaged or otherwise presents a hazard to the public health and the environment, arrives at the facility, and is not acceptable to the owner or operator, but cannot be transported, pursuant to the requirements of WAC 173-303-370(5), Manifest system, reasons for not accepting dangerous waste shipments; | The site-level description of actions is addressed in this plan. For TSD units that receive offsite waste shipments, location-specific documentation addresses these circumstances. | Site-level: DOE/RL-94-02, section 1.3.4.<br><br>Unit-level: location-specific documentation. |

| REQUIREMENT SOURCE | REQUIREMENT DESCRIPTION | HOW DOES REQUIREMENT APPLY TO HANFORD? | WHERE IS REQUIREMENT MET IN OCUMENTATION? |
|---|---|---|---|
| WAC 173-303-350(3)(c)<br><br>(Permit requirement) | The contingency plan must contain the following: (c) A description of the arrangements agreed to by local police departments, fire departments, hospitals, contractors, and state and local emergency response teams to coordinate emergency services as required in WAC 173-303-340(4); | DOE/RL-94-02, section 3.7 and Table 3-1 contain this information. This requirement is met at the site level. No location-specific information is needed to meet this requirement. | Site-level: DOE/RL-94-02, sections 3.2.3, 3.3.1, 3.3.2, 3.4, 3.4.1.1, 3.4.1.2, 3.4.1.3, 3.7, and Table 3-1. |
| WAC 173-303-350(3)(d)<br><br>(Permit requirement) | The contingency plan must contain the following: (d) A current list of names, addresses, and phone numbers (office and home) of all persons qualified to act as the emergency coordinator required under WAC 173-303-360(1). Where more than one person is listed, one must be named as primary emergency coordinator, and others must be listed in the order in which they will assume responsibility as alternates. For new facilities only, this list may be provided to the department at the time of facility certification (as required by WAC 173-303-810(14)(a)(i)), rather than as part of the permit application; | DOE/RL-94-02, section 2.2, discusses personnel job titles, which will fill duties and responsibilities of the Emergency Coordinator, described in WAC 173-303-360. Location-specific/activity-specific documentation for TSD units and 90-day accumulation areas include information on job title, work location, and work phone number for Emergency Coordinator. Emergency Coordinator names and home phone numbers are maintained separate from the contingency plan document, on file in accordance with Hanford Facility RCRA Permit, DW Portion, General Condition II.A.4 and is updated, at a minimum on a monthly basis. | Site-level: None.<br><br>Unit-level: location-specific documentation. |
| WAC 173-303-350(3)(e)<br><br>(Permit requirement) | The contingency plan must contain the following: (e) A list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems, and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities; and | DOE/RL-94-02, Appendix C contains the list of Hanford Fire Department equipment. Location-specific documentation for TSD units and 90-day accumulation areas contain equipment lists for their respective locations. | Site-level: DOE/RL-94-02,<br><br>Appendix C.<br><br>Unit-level: Appropriate equipment identified in location-specific documentation. |
| WAC 173-303-350(3)(f)<br><br>(Permit requirement) | The contingency plan must contain the following: (f) An evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe the signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes. | The site-wide signals are delineated in DOE/RL-94-02, Table 5-1. No location signal information is required unless unique devices are used at the location. Site-wide evacuation routes are contained in DOE/RL-94-02, Figure 7-3. Location-specific evacuation routes will be provided in TSD units and 90-day accumulation area documentation. Evacuation routes for occupied buildings are provided through postings. | Site-level: DOE/RL-94-02, Figure 7-3 and Table 5-1.<br><br>Unit-level: location-specific documentation. |

| REQUIREMENT SOURCE | REQUIREMENT DESCRIPTION | HOW DOES REQUIREMENT APPLY TO HANFORD? | WHERE IS REQUIREMENT MET IN OCUMENTATION? |
|---|---|---|---|
| WAC 173-303-350(4)<br><br>(Permit requirement) | Copies of contingency plan. A copy of the contingency plan and all revisions to the plan shall be: (a) Maintained at the facility; and (b) Submitted to all local police departments, fire departments, hospitals, and state and local emergency response teams that may be called upon to provide emergency services. | Copies of DOE/RL-94-02 are maintained throughout the Hanford Site and with offsite agencies. Copies of location-specific documentation are not being provided to offsite agencies because no agency requested them when asked in 1994. | Site-level: DOE/RL-94-02, section 14.3.7. |
| WAC 173-303-350(5)<br><br>(Permit requirement) | Amendments. The owner or operator shall review and immediately amend the contingency plan, if necessary, whenever: (a) Applicable regulations or the facility permit are revised; (b) The plan fails in an emergency; (c) The facility changes (in its design, construction, operation, maintenance, or other circumstances) in a way that materially increases the potential for fires, explosions, or releases of dangerous waste or dangerous waste constituents, or in a way that changes the response necessary in an emergency; (d) The list of emergency coordinators changes; or (e) The list of emergency equipment changes. | DOE/RL-94-02 and location-specific documentation is revised according to these criteria. Making changes to these documents must also be accomplished in accordance with WAC 173-303-830, when applicable. | Site-level: DOE/RL-94-02, section 14.3.1.1. |
| WAC 173-303-355(1)<br><br>(Permit requirement) | Owners or operators must coordinate preparedness and prevention planning and contingency planning efforts, conducted under WAC 173-3-3-340 and -350 with local emergency planning committees established pursuant to Title III of the 1986 Superfund Amendments and Reauthorization Act. | RL coordinates planning actions with three LEPCs: Benton County, Franklin County, and Grant County. | Site-level: DOE/RL-94-02, sections 3.1, 3.1.1, and 3.4. |
| WAC 173-303-355(2) | Appropriate and generally accepted computer models should be utilized to determine the impacts of a potential catastrophic air release due to fire, explosion, or other accidental releases of hazardous constituents. Evacuation plans prepared pursuant to WAC 173-303-350(3)(d) must include those effected persons and areas identified through these modeling efforts. | The DOE Hanford EOC contains modeling equipment to predict impacts of air releases. | Site-level: DOE/RL-94-02, sections 2.2.2.3.3 and 1.3.3.2. |
| WAC 173-303-360(1)<br><br>(Permit requirement) | Emergency coordinator. At all times, there must be at least one employee either on the facility premises or on call with the responsibility for coordinating all emergency response measures. This emergency coordinator must be thoroughly familiar with all aspects of the facility's contingency plan, required by WAC 173-303-350(2), all operations and activities at the facility, the location and properties of all wastes handled, the location of all records within the facility, and the facility layout. In addition, this person must have the authority to commit the resources needed to carry out the contingency plan. | Duty met by the Hanford Incident Command Structure and staff with supporting on-call personnel. | Site-level: DOE/RL-94-02, section 1.3.4 and 2.2. |
| WAC 173-303-360(2)(a)<br><br>(Permit requirement) | Emergency procedures. The following procedures must be implemented in the event of an emergency. (a) Whenever there is an imminent or actual emergency situation, the emergency coordinator (or his designee when the emergency coordinator is on call) must immediately: (i) Activate internal facility alarms or communication systems, where applicable, to notify all facility personnel; and (ii) Notify appropriate state or local agencies with designated response roles if their help is needed. | Alarm activation can be accomplished by the discoverer of the event (fire/911), or the Hanford Incident Command System and staff with supporting on-call personnel.<br><br>Notification made to non-Hanford agencies with designated response roles agencies are accomplished via 911 telephones to request assistance (fire, ambulance, law enforcement). | Site-level: DOE/RL-94-02, sections 1.3.4 and 5.2.1. |

| REQUIREMENT SOURCE | REQUIREMENT DESCRIPTION | HOW DOES REQUIREMENT APPLY TO HANFORD? | WHERE IS REQUIREMENT MET IN OCUMENTATION? |
|---|---|---|---|
| WAC 173-303-360(2)(b)<br><br>(Permit requirement) | Emergency procedures. (b) Whenever there is a release, fire, or explosion, the emergency coordinator must immediately identify the character, exact source, amount, and areal extent of any released materials. | Hanford Incident Command System and staff with supporting on-call personnel. | Site-level: DOE/RL-94-02, sections 2.2.1.1.2(f) and 2.2.1.1.3(g). |
| WAC 173-303-360(2)(c)<br><br>(Permit requirement) | Emergency procedures. (c) Concurrently, the emergency coordinator shall assess possible hazards to human health and the environment (considering direct, indirect, immediate, and long-term effects) that may result from the release, fire, or explosion. | Hanford Incident Command System and staff with supporting on-call personnel. | Site-level: DOE/RL-94-02, section 4.2. |
| WAC 173-303-360(2)(d)<br><br>(Permit requirement) | Emergency procedures. (d) If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten human health or the environment, he must report his findings as follows: (i) If his assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities. He must be available to help appropriate officials decide whether local areas should be evacuated; and (ii) He must immediately notify the department and either the government official designated as the on-scene coordinator, or the National Response Center (using their 24-hour toll free number (800) 424-8802). | Hanford Incident Command System and staff with supporting on-call personnel.<br><br>ONC personnel notify local authorities if evacuation is advisable on behalf of the Hanford Incident Command Structure.<br><br>Site contractor environmental single point-of-contact personnel perform the assessment report notification to Ecology (Kennewick) and RL (the on-scene coordinator on behalf of the Hanford Incident Command Structure. NRC is not called. | Site-level: DOE/RL-94-02, sections 2.2.1.1.2(a) &(d), 2.2.1.1.3(a)&(e), 5.1.1, 5.1.1.2, 5.1.2, and 5.1.2.1. |
| WAC 173-303-360(2)(e)<br><br>(Permit requirement) | Emergency procedures. (e) His assessment report must include: (i) Name and telephone number of reporter; (ii) Name and address of facility; (iii) Time and type of incident (e.g., release, fire); (iv) Name and quantity of material(s) involved, to the extent known;<br><br>(v) The extent of injuries, if any; and (vi) The possible hazards to human health or the environment outside the facility. | Site contractor environmental single point-of-contact personnel perform the assessment report notification to Ecology (Kennewick) and RL after obtaining it from location-specific personnel. | Site-level: DOE/RL-94-02, sections 2.2.1.1.2(d), 2.2.1.1.3(e), 5.1.1, 5.1.1.2, and 5.1.2.1. |
| WAC 173-303-360(2)(f)<br><br>(Permit requirement) | Emergency procedures. (f) During an emergency, the emergency coordinator must take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other dangerous waste at the facility. These measures must include, where applicable, stopping processes and operations, collecting and containing released waste, and removing or isolating containers. | Hanford Incident Command System and staff with supporting on-call personnel. | Site-level: DOE/RL-94-02, sections 2.2.1.1.2(f) and 2.2.1.1.3(g). |
| WAC 173-303-360(2)(g)<br><br>(Permit requirement) | Emergency procedures. (g) If the facility stops operations in response to a fire, explosion, or release, the emergency coordinator must monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, wherever this is appropriate. | Hanford Incident Command System and staff with supporting on-call personnel. | Site-level: DOE/RL-94-02, sections 2.2.1.1.2(f) and 2.2.1.1.3(g). |
| WAC 173-303-360(2)(h)<br><br>(Permit requirement) | Emergency procedures. (h) Immediately after an emergency, the emergency coordinator must provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility. | Onsite Recovery Manager with supporting on-call personnel. | Site-level: DOE/RL-94-02, section 9.2.3. |

| REQUIREMENT SOURCE | REQUIREMENT DESCRIPTION | HOW DOES REQUIREMENT APPLY TO HANFORD? | WHERE IS REQUIREMENT MET IN OCUMENTATION? |
|---|---|---|---|
| WAC 173-303-360(2)(i)<br><br>(Permit requirement) | Emergency procedures. (i) The emergency coordinator must ensure that, in the affected area(s) of the facility: (i) No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and (ii) All emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed. | Onsite Recovery Manager with supporting on-call personnel. | Site-level: (I) DOE/RL-94-02, section 9.2.3.<br><br>Site-level: (ii) DOE/RL-94-02, section 11.2. |
| WAC 173-303-360(2)(j)<br><br>(Permit requirement) | Emergency procedures. (j) The owner or operator must notify the department, and appropriate local authorities, that the facility is in compliance with (i) of this subsection before operations are resumed in the affected area(s) of the facility. | Site contractor environmental single point-of-contact personnel perform this notification, when applicable, on behalf of the Onsite Recovery Manager. | Site-level: DOE/RL-94-02, section 5.1.2.3. |
| WAC 173-303-360(2)(k)<br><br>(Permit requirement) | Emergency procedures. (k) The owner or operator must note in the operating record the time, date, and details of any incident that requires implementing the contingency plan. Within fifteen days after the incident, he must submit a written report on the incident to the department. The report must include: (i) Name, address, and telephone number of the owner or operator; (ii) Name, address, and telephone number of the facility; (iii) Date, time, and type of incident (e.g., fire, explosion); (iv) Name and quantity of material(s) involved; (v) The extent of injuries, if any; (vi) An assessment of actual or potential hazards to human health or the environment, where this is applicable; (vii) Estimated quantity and disposition of recovered material that resulted from the incident; (viii) Cause of incident; and (ix) Description of corrective action taken to prevent reoccurrence of the incident. | Site contractor management through RL ensures the note in the operating record is performed and prepares the 15-day report to Ecology. | Site-level: DOE/RL-94-02, section 5.1.2.2. |
| 40 CFR 761.65(c)(1)(iv) and (c)(7)(ii)<br><br>SPCC Plans for PCBs | Temporary Storage Areas (less than 30-days).<br><br>(c)(1)(iv): PCB containers containing liquid PCBs at concentrations of $\geq$50 ppm, provided a Spill Prevention, Control and Countermeasure Plan has been prepared for the temporary storage area in accordance with part 112 of this chapter and the liquid PCB waste is in packaging authorized in the DOT Hazardous Materials Regulations at 49 CFR parts 171 through 180 or stationary bulk storage tanks (including rolling stock such as, but not limited to, tanker trucks, as specified by DOT).<br><br>(c)(7)(ii): The owners or operators of any facility using containers described in paragraph (c)(7)(i) of this section, shall prepare and implement a Spill Prevention Control and Countermeasure (SPCC) Plan as described in Part 112 of this title. In complying with 40 CFR Part 112, the owner or operator shall read "oil(s)" as "PCB(s)" whenever it appears. The exemptions for storage capacity, 40 CFR 112.1(d)(2), and the amendment of SPCC plans by the Regional Administrator, 40 CFR 112.4, shall not apply unless some fraction of the liquids stored in the container are oils as defined by section 311 of the Clean Water Act. | When SPCC plans apply to Hanford Site activities, the information not covered in site-wide documentation must be addressed in location-specific documentation. | Site-level: DOE/RL-94-02, sections 1.1 (fourth paragraph), 1.2 (first bullet, sixth dash and second bullet, fourth dash), and 2.2.1.1.2 (first paragraph).<br><br>Unit-level: appropriate location-specific documentation. |

# Hanford Facility RCRA Permit Modification
# Part III, Chapter 3 and Attachment 28
# PUREX Storage Tunnels

Replacement Section

## Index

This plan covers the following buildings and structures: 218-E-14 (Tunnel Number 1), 218-E-15 (Tunnel Number 2).

Approved by: _____ 3/20/00
Building Emergency Director — Date

Approved by: _____ 3-21-00
Emergency Preparedness — Date

Approved by: _____ 3/21/00
Hanford Fire Department — Date

Approved by: _____ 20 Mar '00
Environmental Compliance Officer — Date

This document will be reviewed annually and updated if necessary by the Building Emergency Director unless Hanford Facility RCRA Permit coordination requirements provides otherwise.

# Contents



## Figure



## Table

# 1.0 GENERAL INFORMATION

The Plutonium-Uranium Extraction 218-E-14 and 218-E-15 (PUREX Storage Tunnels) are located in the 200 East Area of the 1,450-square kilometer U.S. Department of Energy, Richland Operations Office (DOE-RL) operated Hanford Site in southeastern Washington State. The Hanford Site Emergency Preparedness Program is based upon the incident command system which allows a graded approach for responses to emergency events. This plan contains a description of facility specific planning and response. It is used in conjunction with DOE/RL-94-02, *Hanford Emergency ManagementPlan*. Response to events is performed using facility specific and/or Site level emergency procedures.

## 1.1 Facility Name

U.S. Department of Energy Hanford Site PUREX Storage Tunnels.

## 1.2 Facility Location

Benton County, Washington; within the 200 East Area. Structures covered by this plan are:

218-E-14 Tunnel Number 1
218-E-15 Tunnel Number 2

## 1.3 Owner

U.S. Department of Energy
Richland Operations Office
825 Jadwin Avenue
Richland, Washington 99352

## 1.4 Facility Manager

Fluor Hanford
P.O. Box 1000
Richland, Washington 99352-1000

## 1.5 Description of Facility and Operations

The PUREX Storage Tunnels consist of two structures, 218-E-14 (Tunnel Number 1) and 218-E-15 (Tunnel Number 2). The tunnels are used for the storage of material from the PUREX Plant and from other onsite sources. The material stored in the tunnels contains dangerous waste and varying amounts of radioactive contamination; therefore, the stored material is managed as mixed waste. Tunnel Number 1 is filled to capacity. Tunnel Number 2 currently has storage positions available and may continue to receive mixed waste from the PUREX Plant and other onsite sources until the tunnel is either filled to capacity or a determination is made that waste will no longer be received.

Mixed waste is stored in the PUREX Storage Tunnels on railcars that are modified to serve as both transporter and storage platforms. Each railcar is retrievable. However, because the railcars are stored on a single, dead-end railroad spur inside each storage tunnel, the railcars can be removed only in reverse order (i.e., last in, first out).

### 1.6 Building Evacuation Route

The PUREX Storage Tunnels evacuation route is shown in Figure 1. During an emergency, personnel that enter the storage tunnels during material placement operations will evacuate via the north end of the railroad tunnel.

## 2.0 EMERGENCY COORDINATORS/BUILDING EMERGENCY DIRECTOR

**Table 2-1. Emergency Coordinator/Building Emergency Director [a]**

| Designation | Job title | Work location | Work phone |
|---|---|---|---|
| Primary | Accelerated Deactivation Project Director | MO-414 | 373-4999 |
| Alternate | Manager | MO-414 | 373-4160 |
| Alternate | Manager | MO-414 | 373-4134 |
| Alternate | Manager | MO-408 | 376-4098 |
| Alternate | Manager | MO-414 | 376-7678 |

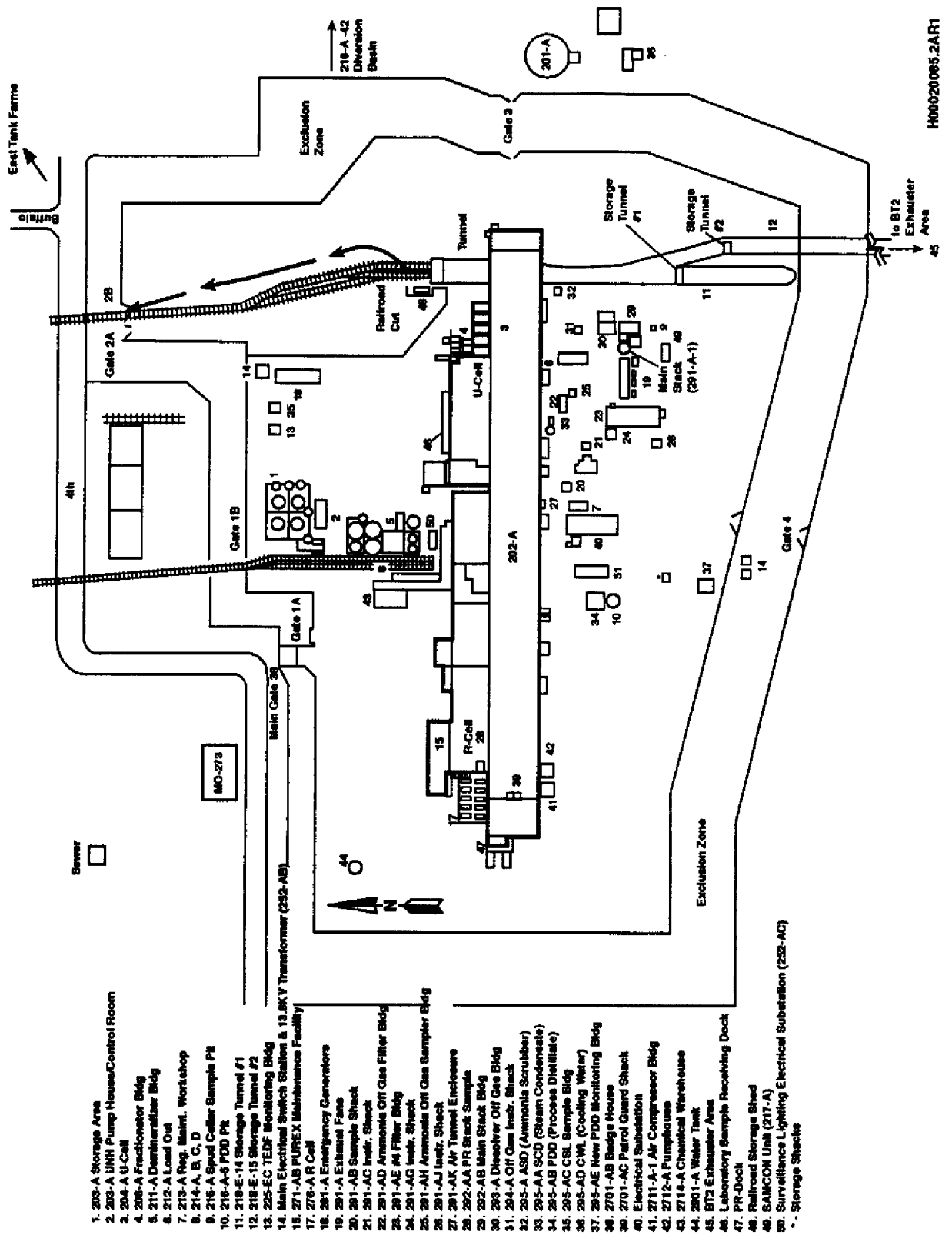
[a]The names and home phone numbers of all Emergency Coordinators/Building Emergency Director (EC/BED) are maintained at the single point-of-contact (the Hanford Patrol Operations Center) telephone number 373-3800 in accordance with the Hanford Facility RCRA Permit, Dangerous Waste Portion, General Condition II.A.4.

[a]Emergency response will be directed by the EC/BED until the Incident Commander arrives. The incident command structure and staff with supporting on-call personnel fulfill the responsibilities of the EC/BED as discussed in WAC 173-303-360.

During events, facility personnel perform response duties under the direction of the EC/BED. The Incident Command Post (ICP) is managed by either the senior Hanford Fire Department member present on the scene or senior Hanford Patrol member present on the scene (security events only). These individuals are designated as the Incident Commander (IC) and as such have the authority to request and obtain any resources necessary for protecting people and the environment. The EC/BED becomes a member of the ICP and functions under the direction of the IC. In this role, the EC/BED continues to manage and direct facility operations.

A listing of the primary and alternate EC/BEDs by title, work location and work telephone numbers is identified in the table above. The EC/BED is on the premises or is available through an "on-call" list 24 hours a day.

**Figure 2-1 . PUREX Storage Tunnels Evacuation Route**



## 3.0 IMPLEMENTATION OF THE PLAN

To meet the requirements of the WAC, this plan will be considered implemented when the EC/BED has determined that a release, fire, or explosion involving dangerous waste, mixed waste or dangerous waste constituents that could threaten human health or the environment (WAC 173-303 Emergency) has occurred at the facility. This plan will be used in conjunction with DOE/RL-94-02, Section 4.2, for event recognition and response.

Under DOE guidance, this plan will be considered implemented whenever the EC/BED determines that one of the incidents listed in Section 3.1 has or will occur and that the severity is or will be such that there is a potential to endanger human health or the environment (DOE Unusual Occurrence or Emergency). Incidents listed in Section 3.1 could also be considered DOE emergencies that cause activation of the Hanford-Emergency Operations Center and offsite emergency response organizations.

The EC/BED must assess each incident to determine the response necessary to protect the personnel, facility, and the environment. If assistance from Patrol, Fire, or ambulance units is required, the Hanford Emergency Response Number (911) must be used to contact the Patrol Operations Center and request the desired assistance. To request other resources or assistance from outside the facility, the Patrol Operations Center business number is used (373-3800).

### 3.1 Dangerous and/or Mixed Waste

A seismic event, explosion, tornado, or an aircraft crash could cause damage to the storage tunnels and could involve environmental exposure to mixed waste. These events are considered the only credible sources of a release as the PUREX Storage Tunnels are unoccupied structures and there are no continuous processes associated with waste storage.

Emergency responses for credible dangerous and/or mixed waste releases can be found in the following sections.

### 3.2 Fire or Explosion

The fire or explosion hazard associated with the PUREX Storage Tunnels is considered to be very low because of the minimal amount of combustibles stored within the tunnels and the lack of an ignition source.

Because of the potential for mixed waste to leach, water is not the preferred choice for fire control. Reduction of the air supply to the storage area by isolation of the tunnel exhaust system, if operating, should permit a fire to self-extinguish. Should the fire continue to spread, heavy equipment and cranes will be called to the scene to cover areas of the tunnels that might collapse. In addition, the following actions are taken in the event of a fire or explosion:

- If present in the Tunnels, personnel leave by the nearest safe exit and proceed to the designated staging area for accounting
- The single point-of-contact (911) is notified immediately, who in turn initiates notifications to the EC/BED (or alternate) if necessary
- The EC/BED proceeds directly to the scene (if not already there)
- The EC/BED obtains all necessary information pertaining to the incident

- Depending on the severity of the event, the EC/BED or his/her designee may be required to provide notifications to the site contractor environmental single point of contact, which in turn notifies offsite agencies and/or the occurrence notification center informing them as to the extent of the emergency (including estimates of mixed waste quantities released to the environment) and any actions necessary to protect nearby buildings and/or structures
- Depending on the severity, the EC/BED requests activation of the affected area ICP to establish organizations to provide assistance from DOE-RL, other Hanford site contractors, and outside agencies (if 911 is called, the ICP will automatically be activated)
- The Hanford Patrol establishes roadblocks within the area to route traffic away from the emergency scene
- If necessary, Hanford Fire Department medical personnel remove injured personnel to a safe location, apply first aid, and prepare the injured for transport to medical aid stations or to local hospitals.

Depending on the magnitude of a natural phenomena event, fire, or an explosion, damage to the storage tunnels is possible. The hazards could involve personnel and environmental exposure to mixed waste. In the event of such an occurrence, a recovery plan will be developed. The recovery plan will take into consideration methods, if any, for retrieval of the waste stored within the tunnels.

### 3.3 Seismic Event/Tornado

Depending on the magnitude of the seismic event or tornado, damage to the storage tunnels is possible. The hazards could involve personnel and environmental exposure to mixed waste.

Emergency responses for seismic events and tornadoes would be the same as those for a fire or explosion. Refer to Section 3.2 of this plan.

### 3.4 Aircraft Crash

In addition to the potential for serious injuries or fatalities involved with an aircraft crash, damage to the storage tunnels is possible, which would result in a fire, explosion, or a mixed waste release. The hazards could involve personnel and environmental exposure to mixed waste.

Refer to Section 3.2 of this plan for emergency responses for fires and explosions.

### 3.5 Bomb Threat/Explosive Device

Depending on the magnitude of an explosion, damage to the storage tunnels is possible. The hazards could involve personnel and environmental exposure to mixed waste. For emergency responses, refer to Section 3.2 of this plan for explosions.

### 3.6 Damaged Dangerous and/or Mixed Waste Shipment

The PUREX Storage Tunnels do not accept shipments from offsite; therefore, the following response procedures only apply to the receipt of a damaged mixed waste shipment from onsite.

If the damaged shipment of hazardous substance, or dangerous waste/mixed waste arrives at the PUREX Storage Tunnels and the shipment is unacceptable for receipt, the damaged shipment should not be moved. The TSD unit personnel instead need to determine if there has been a release. If there has been a release, TSD unit personnel perform the following actions.

- Notify the supervisor or manager to advise of the situation. The supervisor or manager contacts the Emergency Coordinator in order to respond and assist in the evaluation of, and response to, the release (response to spills or releases may result in implementation of the contingency plan if the Emergency Coordinator makes this determination).
- Notify the shipper or generating unit of the damaged shipment and request that they provide any chemical information necessary to assist in responding to the release.
- Actions are taken to contain and/or to stop the spill if all of the following are true:
  - The identity of the substance(s) involved is known
  - Appropriate protective equipment and control/cleanup supplies are readily available
  - Personnel present have received the appropriate training and can safely perform the action(s) without assistance, or assistance is readily available from other trained TSD unit personnel.

If any of the above conditions are not met, or there is any doubt, personnel evacuate the area and remain outside, upwind of the TSD unit, pending the arrival of the Emergency Coordinator. Personnel remain available for consultation with the Emergency Coordinator, Hanford Fire Department, or other emergency response personnel, as appropriate.

## 4.0 UNIT/BUILDING EMERGENCY RESPONSE PROCEDURES

The initial response to any emergency is to immediately protect the health and safety of persons in the area. Identification of released material is essential to determine appropriate protective actions. Containment, treatment, and disposal assessment are secondary responses.

Emergency action levels associated with event classifications applicable to the PUREX Storage Tunnels include the following. A Site Area Emergency can be declared for a radioactive material release resulting from an explosion, natural hazards (i.e., seismic event and/or tornado), and aircraft crash. An Alert Emergency can be declared for a fire, explosion, or high winds. Additional detail concerning emergency action levels is identified in *Emergency Plan Implementing Procedures*, DOE-0223, Appendix 1-2.G. The preceding sections describe the process for implementing basic protective actions as well as descriptions of response actions for events.

### 4.1 Notification

Notification will be made in accordance with the requirements of WAC 173-303-145 and WAC 173-303-360.

### 4.2 Identification of Released/Spilled Materials

Methods for identifying the character, source, amount, and areal extent of any materials when there has been a release or spill to the environment, a fire, or an explosion are outlined in DOE/RL-94-02, Section 4.2.

### 4.3 Prevention of Recurrence or Spread of Fires, Explosions, Releases

The EC/BED, as part of the incident command structure, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The following actions are taken:

- Isolate the area of the initial incident by shutting off power, closing off ventilation systems, if still operating, etc., to minimize the spread of a release and/or the potential for a fire or explosion

- Inspect surface of the tunnels for leaks, cracks, or other damage
- Contain and isolate residual mixed waste material
- Cover or otherwise stabilize areas where residual released mixed waste remains to prevent migration or spread from wind or precipitation run-off
- Install new structures, systems, or equipment to enable better management of mixed waste
- Reactivate adjacent operations in affected areas only after cleanup of residual mixed waste is achieved.

### 4.4 Termination of Event

For events where the Hanford Emergency Operations Center (Hanford-EOC) is activated, the RL Emergency Manager has the authority to declare event termination. This decision is based on input from the EC/BED, Incident Commander, and other emergency response organization members. For events where the Hanford-EOC is not activated, the Incident Command structure and staff will declare event termination.

### 4.5 Incident Recovery and Restart of Operations

A recovery plan is developed when necessary. A recovery plan is needed following an event where further risk could be introduced to personnel, the facility, or the environment through recovery action and/or to maximize the preservation of evidence. Depending on the magnitude of the event and the effort required to recover from it, recovery planning may involve personnel from RL and other contractors. If a recovery plan is required, it is reviewed by appropriate personnel and approved by a Recovery Manager before restart. Restart of operations is performed in accordance with the approved plan.

If this plan was implemented for a WAC emergency (see Section 3.0 of this plan), the Washington State Department of Ecology must be notified before operations can resume. DOE/RL-94-02, Section 5.1, discusses different reports to outside agencies. This notification is in addition to other required reports and must include information documenting the following conditions:

1. There are no incompatibility issues with the waste and released materials from the incident.
2. All the equipment has been clean, fit for its intended use, and placed back into service.

Additional information that Ecology requests regarding these restart conditions may be included in the required 15-day report identified in WAC 173-303-360(2)(k).

For emergencies not involving activation of the Hanford-EOC, the EC/BED ensures that conditions are restored to normal before operations are resumed. An onsite Recovery Manager could be appointed at the discretion of RL to restore conditions to normal. This process is detailed in DOE/RL-94-02, Section 9.0. The makeup of this organization depends on the extent of the damage and its effects. The onsite recovery organization will be appointed by the appropriate contractor's management.

### 4.6 Incompatible Waste

After an event, the EC/BED or the onsite recovery organization ensures that no waste that might be incompatible with the released material is treated, stored, and/or disposed of until cleanup is completed. Cleanup actions are taken by facility personnel or other assigned personnel. DOE/RL-94-02, Section 9.2.3, describes actions to be taken.

Waste from cleanup activities is designated and managed as newly generated waste. A field check for compatibility before storage is performed, as necessary. Incompatible wastes are not placed in the same container. Containers of waste are placed in storage areas appropriate for their compatibility class.

If incompatibility of waste was a factor in the incident, the EC/BED or the onsite recovery organization ensures that the cause is corrected. Examples include modification of an incompatibility chart of increased scrutiny of waste from a generating unit when incorrectly designated waste caused or contributed to an incident.

### 4.7 Post Emergency Equipment Maintenance and Decontamination

All equipment used during an incident is decontaminated (if practicable) or disposed of as spill debris. Decontaminated equipment is checked for proper operation before storage for subsequent use. Consumables and disposed materials are restocked. Fire extinguishers are recharged or replaced.

The EC/BED ensures that all equipment is cleaned and fit for its intended use before operations are resumed. Depleted stocks of neutralizing and absorbing materials are replenished, self-contained breathing apparatus are cleaned and refilled, protective clothing is cleaned or disposed of and restocked, etc.

## 5.0 EMERGENCY EQUIPMENT

Because personnel only enter the storage tunnels during material placement operations, no permanent emergency equipment, communications equipment, warning systems, personal protective equipment, or spill control and containment supplies are located in the tunnels.

During storage tunnel operations or an emergency response event, personnel use portable emergency equipment, which could include heavy equipment and cranes (Section 3.2). Also, for such operations, work plans are followed and pre-job safety meetings take place.

## 6.0 COORDINATION AGREEMENTS

The DOE-RL has established a number of coordination agreements, or memoranda of understanding (MOU) with various agencies to ensure proper response resource availability for incidents involving the Hanford Site. A description of the agreements is contained in DOE/RL-94-02, Table 3-1.

## 7.0 REQUIRED REPORTS

Post incident written reports are required for certain incidents on the Hanford Site in accordance with DOE/RL-94-02, Section 5.1.

## 8.0 REFERENCES

DOE/RL-94-02, Hanford Emergency Management Plan, as amended.

Hanford Facility RCRA Permit, Dangerous Waste Portion, Washington State Department of Ecology, Olympia, Washington, as amended.

DOE-0223, Emergency Plan Implementing Procedures, as amended.

# CONTENTS

# 5.0 GROUNDWATER MONITORING [D-10]

## 5.1 EXEMPTION FROM GROUNDWATER PROTECTION REQUIREMENTS [D-10a]

A waiver from the groundwater monitoring requirements as allowed under WAC 173-303-645 is not requested. Therefore, the requirements of the Washington Administrate Code for groundwater monitoring are applicable to the LERF, except as modified in accordance with Ecology variance discussed in Section 5.5.

## 5.2 INTERIM STATUS PERIOD GROUNDWATER MONITORING DATA [D-10b]

Information on interim status groundwater monitoring activities is provided in *Interim Status Ground Water Monitoring Plan for the 200 East Area Liquid Effluent Retention Facility* (WHC 1991a), in *Hanford Site Groundwater Monitoring for Fiscal Year 1999* (PNNL 2000), and in the Hanford Environmental Information System. Groundwater monitoring data provided no evidence that dangerous, non-radioactive constituent from the site has entered the groundwater.

## 5.3 AQUIFER IDENTIFICATION [D-10c]

The characteristics of the uppermost aquifer beneath the LERF and the regional physiographic, geologic, and hydrogeologic setting of the LERF are summarized in Chapter 5.0 of the General Information Portion (DOE/RL-91-28).

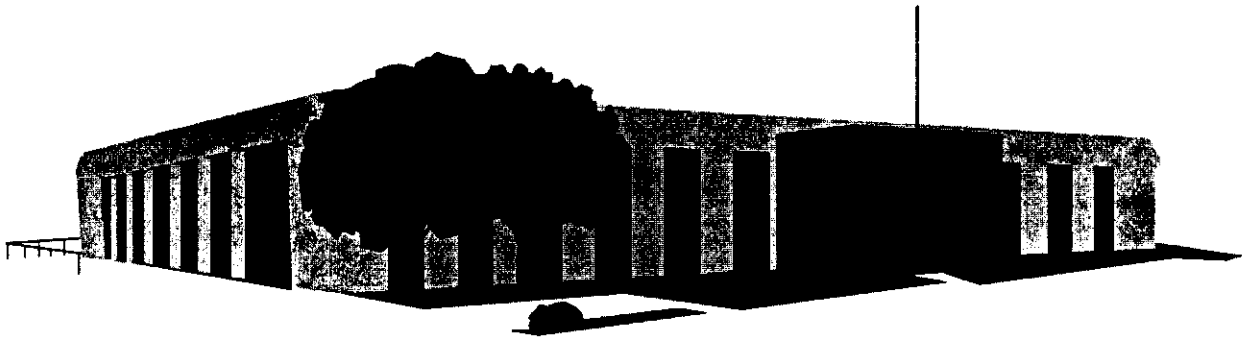
## 5.4 CONTAMINANT PLUME DESCRIPTION [D-10d]

A description of the contaminant plumes existing beneath the 200 East Area and 200 West Area is provided in Chapter 5.0 of the General Information Portion (DOE/RL-91-28).

## 5.5 DETECTION MONITORING PROGRAM [D-10e]

A groundwater monitoring program meeting the interim status groundwater monitoring standards will be implemented using one upgradient and two downgradient monitoring wells The groundwater monitoring requirements of 40 CFR 265 Subpart F will remain in effect except for downgradient well coverage, for which a variance has been granted. This approach has been approved by the Washington State Department of Ecology in a letter dated September 22, 1999 granting the U.S. Department of Energy a variance from interim status groundwater monitoring requirements. This monitoring program will remain in effect until an approved final status monitoring plan is designed and implemented through incorporation via permit modification. The variance for downgradient well coverage will end on the earlier of eighteen months after September 22, 1999, or the inability of another monitoring well to produce representative samples of groundwater. A revised final status monitoring plan including the process for transitioning to alternative monitoring as wells go dry will be submitted to Ecology for approval.

# BUILDING EMERGENCY PROCEDURE
## 305-B Storage Unit



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Environmental Management Services — 5/9/00 Date

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Building Emergency Director — 5/19/00 Date

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Facilities Operations Manager — 6/1/00 Date

Approved:

Emergency Preparedness Office — 6/13/00 Date

**June 2001**
Scheduled Revision Date

# 7.0 Contents

# 7.0 Building Emergency Procedure 305-B Storage Unit

## 7.1 General Information

The information contained in this chapter is the unit contingency plan, as required under WAC 173-303-806(4)(a)(vii). This chapter is also the Building Emergency Procedure (BEP) as required under the DOE-RL Hanford Emergency Management Plan and PNNL Manual, PNNL-MA-110. It supersedes all previous contingency plans and building emergency procedures (BEPs). It is to be maintained in the locations shown in Section 7.13 of this procedure.

A BEP is required under the DOE-RL Hanford Emergency Management Plan for each building on the Hanford Site. This Contingency Plan has been designed to meet the requirements for a BEP as well as the Ecology requirements for a contingency plan for the 305-B Storage Unit. The Hanford Emergency Management Plan details the membership of the DOE-RL Site Management Team (SMT) mentioned in Section 7.3 and following sections, and the procedure for notifying and mobilizing the team.

PNNL shall review and immediately amend, if necessary, this procedure whenever:

- Applicable regulations or the facility permit are revised;
- The procedure fails in an emergency;
- The facility changes (in its design, construction, operation, maintenance, or other circumstances) in a way that materially increases the potential for fires, explosions, or releases of dangerous waste or dangerous waste constituents, or in any way that changes the response necessary in an emergency;
- The list of emergency equipment changes.

Amendments to the procedure, if necessary following review, will be made in accordance with Chapter 1, Section 1.5 of the 305-B Storage Unit Part B Permit Application.

### 7.1.1 Facility Name

305-B Storage Unit
Alaska St., 300 Area
Richland, WA 99352

### 7.1.2 Facility Location

305-B Storage Unit is located in the Northwest portion of the 300 Area of the Hanford Site on Alaska Street.

### 7.1.3 Owner/Operator

The 305-B Storage Unit is owned by the United States Department of Energy (DOE) and is co-operated by Battelle for the Pacific Northwest National Laboratory (PNNL).

### 7.1.4 Facility Description

The 305-B Storage Unit is a dangerous and radioactive mixed waste storage facility located in the 300 Area of the Hanford Site. The unit is owned and operated by DOE-RL and co-operated by Battelle for PNNL. It is used for the collection, consolidation, and packaging of containerized dangerous and radioactive mixed waste. Typically, 305-B Storage Unit handles various types of small volume wastes from research laboratory activities.

### 7.1.5 Hanford Site Emergency Sirens/Alarms

| Signal | Meaning | Response |
|---|---|---|
| Gong (2 gongs/sec) | Fire | Evacuate building. Move upwind. Keep clear of emergency vehicles. |
| Siren (steady blast) | Area Evacuation | Proceed promptly to north parking lot accountability area. Follow instructions. |
| Wavering Siren | Take Cover | Close all exterior doors, turn off all intake ventilation and notify EMSD of your whereabouts. Requests call back for status and monitor portable radios. |
| Howler (Aa-oo-gah) | Criticality | Follow "take cover" instructions above. (No criticality will take place in 305-B Storage Unit since fissile materials are not accepted for storage.) |
| To hear these signals and a description of actions to take, call 373-2345. | | |

The following is presented to define specific emergency actions for personnel assigned to 305-B Storage Unit for different types of emergencies that could be encountered during normal operations.

Area-wide Evacuation. (Signal: Steady siren of 3-5 minutes' duration) In the event of an area-wide evacuation of the 300 Area, 305-B Storage Unit personnel will shut down equipment, secure wastes (especially RMW), and secure classified documents (or carry them with them), if time permits. They will then report to the north parking lot accountability area. Notify the BED of any ongoing processes or any compromises to security. The zone warden will account for all facility personnel.

Take Cover. (Signal: Wavering siren) In the event a take cover alarm is sounded, 305-B Storage Unit personnel will stay inside the 305-B Storage Unit, close all exterior doors, and turn off all intake ventilation. They will secure all wastes and classified documents. Personnel will then contact Environmental Management Services with their whereabouts and request a call back for status.

### 7.1.6 Building Specific Emergency Alarms

The 305-B Storage Unit has an alarm system (2 gongs/sec) that is monitored by the Hanford Fire Department (HFD). A manual fire alarm pull box is located near each exit door.

### 7.1.7 Communication Equipment

Unit operations personnel may also use telephones, or the building PA system. Further description of communication equipment is located in Chapter 6, Sections 6.3.1.1 and 6.3.1.2 of the 305-B Storage Unit Part B Permit Application.

## 7.2 Purpose of the Building Emergency Procedure

This procedure provides for the safety of employees, other contractor personnel, visitors, and members of the general public in the event of an emergency. It also is designed to minimize hazards resulting from fires, explosions, or any other unplanned sudden or non-sudden release of dangerous waste or dangerous waste constituents to air, soil, or water. The provisions of the procedure will be carried out immediately whenever there is a fire, explosion, or release of dangerous waste or dangerous waste constituents, which could threaten human health or the environment.

## 7.3 Building Emergency Response Organization

The 305-B Storage Unit BERO is an emergency response organization with clearly defined responsibilities. The BERO consists of pre-designated and trained individuals who have been assigned emergency response activities associated with 305-B Storage Unit.

**Note:** DOE-RL and other (non-PNNL) contractor personnel are trained to notify Hanford Emergency number (911 from onsite telephones) operated by the Hanford Patrol who then notifies the PNNL Single Point-of-Contact.

### 7.3.1 Building Emergency Directors and Alternates

The Building Emergency Director (BED) has the responsibility for the welfare and safety of the building personnel and for directing efforts to control, evaluate, and terminate the event if the building is the site of an event. The BED performs the duties of the Emergency Coordinator as prescribed under WAC 173-303-360 and has the authority to commit the resources needed to carry out the BEP.

The BED manages facility operations and personnel and is responsible for ensuring implementation of appropriate emergency procedures and their follow-up 24 hours a day. Activities include:

- Direct configuration control over facility systems and components.
- Implement Emergency Response and Follow-up.
- Responsible for the duties of the Facility Operations Specialist per PNNL MA-110 or delegate to someone to act as Facility Operations Specialist if necessary.
- Activates the BERO and allocates personnel to conduct facility-specific emergency response actions (within the affected facility boundary).
- Categorization and notification of the incident to the site contractor, Single Point-of-Contact and/or the Occurrence Notification Center (ONC).
- Directing implementation of initial preplanned area/site protective actions.
- Coordinate emergency response measures.
- Verifies the appropriate alarm is sounded when necessary.
- Acts as a member of the ICP and provide information and assistance to the responding agencies as requested to mitigate the event.
- Arranges care for any injured persons.
- Maintenance of emergency equipment.
- Timely implementation of contingency plan in the event of an emergency.
- Be thoroughly familiar with:
  - 305-B Storage Unit Emergency Procedure
  - All operations and activities
  - Location and characteristics of waste handled
  - Location of all records
  - Physical layout of the building and area of responsibility

### 7.3.2 Other Members of the Building Emergency Response Organization (BERO)

#### 7.3.2.1 Zone Wardens

Zone Wardens provide information to the BED via the Staging Area Supervisor to ensure that no one is unaccounted for, and assists as required in additional duties as determined by the BED. They determine if all personnel have left their assigned area by performing a thorough room-by-room search, if safe to do so (refer to Note below), including unoccupied spaces such as stairwells, corridors, closets, and other common areas. They determine if aid and/or rescue are required and aid those who may need help in evacuating the building. Ensure that disabled persons receive whatever assistance may be required for a safe and orderly evacuation. Report the occupancy status of the assigned zone(s) to the Staging Area Supervisor and note areas that could not be checked.

**Note:** The function of the zone warden is to verify (when possible), that assigned zones have been evacuated, as a means of assisting other emergency responders, and verifying locations of building personnel. The function of zone wardens does not include search and rescue; they are not obligated to enter any area they feel presents a hazard to them. Once the evacuation alarm is sounded, zone wardens should not enter any location in the facility where there are indications that a hazard may exist. The indications include such things as: visible smoke, fire, unusual odors, local alarms, spilled chemicals, indications on the fire alarm supervisory panel, incapacitated personnel, etc. If a zone warden is not in the facility when the evacuation alarm sounds; is a significant distance from their assigned zones; or has been isolated from their zone, they should report to the Staging Area Supervisor at the Staging Area or Incident Command Post for instructions.

#### 7.3.2.2 Staging Area Supervisor

The Staging Area Supervisor (SAS) will direct all activities at the Building Staging Area and is responsible for notifying the BED if all personnel are accounted for, or if help is needed to locate or account for missing personnel. The SAS will also support the BED, if requested. In the event of an extended building evacuation during inclement weather, the BED will identify an Alternate Staging Area.

- The SAS collects the occupancy/accountability status from the Zone Wardens at the Staging Area.
- Report status to the BED at the Staging Area or Incident Command Post.

#### 7.3.2.3 Recorder

Records, in a time-line format, event related notifications and activities associated with the direction administered and information received by the ICP.

#### 7.3.2.4 Environmental, Safety & Health

Provides guidance for establishing safety requirements for mitigation and recovery actions, which include:

- Coordinating any support needed from other disciplines of the PNNL ES&H Directorate (i.e., Environmental Compliance Representatives, Radiological Control, Industrial Hygiene and Field Service Representative).
- Provide telephone notification of incident to DOE-RL contact personnel, Sections 12.4.1.5.1 and 12.4.1.6 of the 305-B Storage Unit Permit Application.

#### 7.3.2.5 DOE-RL

Provide notification of releases to the National Response Center and to Ecology in accordance with the site-wide hazardous waste permit, 40 CFR 302.6, and WAC 173-303-145.

### 7.4 Implementation of the BEP

The overall responsibility for implementation of this Procedure lies with the Building Emergency Director (BED) or the designated alternates. The BED has the responsibilities of the Emergency Coordinator as named in WAC 173-303-360. The BED and alternates are on call 24 hours per day and have the authority to commit all necessary resources (both equipment and personnel) to respond to any facility emergency.

Response by an emergency coordinator is usually obtained through the PNNL Single Point-of-Contact at (509) 375-2400. The Single Point-of-Contact has been designated as the contact point to mobilize a response to any PNNL emergency on the Hanford Site. The Single Point-of-Contact is available at all

times and has the responsibility to contact the BED or alternate to begin responses to emergencies under this procedure.

Due to the security requirements at the Hanford Site, DOE-RL does not submit names or phone numbers of personnel acting as emergency contacts as part of permit applications or other public documents. All emergency notifications to the BED, building managers, etc., are made through the PNNL Single Point-of-Contact. A complete Building Emergency Response Organization listing of positions, names work and home telephone numbers for the 305-B Storage Unit is maintained in a separate, internally controlled, facility document. Copies are distributed, as a minimum, to appropriate facility locations, the Single Point-of-Contact, and with the contingency plan at the 305-B Storage Unit.

The decision by the BED or alternate to implement this Procedure depends on whether an incident in progress may threaten human health or the environment. Immediately after being notified of an emergency, the BED or alternate will go to the site and evaluate the situation. Based on evaluation of the event, the BED or alternate will implement this procedure to the extent necessary to protect human health or the environment.

Incidents discovered by unit personnel trained in emergency response may be responded to according to these procedures prior to the arrival of the BED. However, immediate notification of the BED is still required prior to implementing these procedures.

## 7.5 Facility Hazards

### 7.5.1 Hazardous Materials

This facility contains hazardous material typically found in an industrial facility including:

- Chemical hazards such as corrosives, oxidizers, flammable solids and liquids, poisons, etc.,
- Radioactive materials,
- Hazardous wastes,
- Radioactive mixed wastes

### 7.5.2 Physical (Industrial) Hazards

This facility may contain industrial hazards such as high-voltage equipment, and overhead hazards.

### 7.5.3 Dangerous Mixed Waste

Radioactive mixed waste (RMW) is stored in the basement of the original wing of the building in an area approximately 18' x 32'. The RMW area is also equipped with a secondary containment berm to prevent migration of spilled wastes. Flammable RMW cannot be stored below grade (per Uniform Fire Code) and is stored in an independent area on the first floor of the original wing in individual secondary containment structures.

### 7.5.4 Radioactive Materials

Refer to Section 5.3.

### 7.5.5 Criticality

Not applicable.

## 7.6 Potential Emergency Conditions and Appropriate Response

### 7.6.1 Facility Operations Emergencies

For an Off-Normal Event or Emergency Condition not specifically addressed, call the PNNL Single-Point-of-Contact on 375-2400. PNNL staff who observe a facility condition that may include, but not limited to the following: smoke, heat, vibration, or unusual sounds such as hissing should leave the area immediately and make the appropriate emergency notifications. The following guidance is offered for specific listed incidents:

#### 7.6.1.1 Loss of Utilities

In the event of power failure, all containers of waste will be checked for closure and, if the duration of the outage exceeds 30 minutes, will be returned to their storage cells if they have been removed for labpacking or bulking. Facility equipment will be shut down to allow orderly restoration of power.

In a power failure incident, the Building Manager and the BED are to be notified. The Building Manager is responsible to arrange for restoration of power service to the unit. The BED is responsible to evaluate whether the Contingency Plan should be implemented or whether an evacuation is advisable. If the Contingency Plan is not implemented immediately, site personnel may be required to monitor the unit for continuing release potential during extreme temperature periods. The BED will determine the need for, and extent of, any such monitoring, in consultation with an industrial hygienist if appropriate.

In the event of power loss to site equipment, which results in failure of the equipment, the Building Manager is to be contacted to arrange for repair of the affected equipment and/or provide restoration of power. The BED should be contacted in the event that any failure results in a release or potential release to the environment as described in Section 7.4.

#### 7.6.1.2 Major Process Disruption/Loss of Building Control

Not applicable.

#### 7.6.1.3 Pressure Release

Not applicable.

#### 7.6.1.4 Fire and/or Explosion

In the event of a fire or explosion, the discoverer will pull one of the manual fire alarms and call the Single Point-of-Contact. Automatic initiation of a fire alarm (through the smoke detectors and sprinkler systems) is also possible. The personnel operating the facility are trained in the use of portable fire extinguishers. They will use their best judgment whether to extinguish a fire or evacuate. Under no circumstances will personnel remain in the facility to extinguish a fire if unusual hazards exist. The following actions will be taken in the event of a fire or explosion:

1. Upon actuation of the fire alarm, personnel will shut down equipment, secure wastes, and lock up classified documents (or carry them with them), ONLY if time permits.

2. The alarm automatically signals both the 300 Area HFD station and the Hanford Patrol Headquarters. Both will respond immediately.

3. Personnel shall leave 305-B Storage Unit by the nearest safe exit, and move upwind, keeping the driveway clear.

4. The Single Point-of-Contact shall be immediately notified, who shall in turn notify the BED (or alternate).

5. The BED will go directly to the scene.

6. The BED will obtain all necessary information pertaining to the incident.

7. The BED will contact the Single Point-of-Contact and advise whether to notify the PNNL Occurrence Representative, depending on the severity of the event. Inform the Single Point-of-Contact as to the extent of the emergency (including estimates of dangerous waste or RMW quantities released to the environment) and any actions necessary to protect nearby facilities.

8. Activation of the Emergency Operations Center sets into motion the notification process for DOE, other Hanford contractors, and outside agencies.

9. The Hanford Patrol/Benton County Sheriffs Office will set up roadblocks within the area to route traffic away from the emergency scene.

10. Emergency medical technicians will remove injured personnel to a safe location, apply first aid, and prepare for transport to the medical department (DOE/HEHF) or to hospitals.

11. The HFD will extinguish the fire.

12. All emergency equipment will be cleaned and restored for its intended use immediately after completion of cleanup procedures.

#### 7.6.1.5 Hazardous Material Spill

In addition to the foregoing contingency plan provisions, the following specific actions may be taken for leaks or spills from containers at the unit:

- Container leaks will be stopped as soon as possible through tightening closures, tipping the container to stop the leak, use of plugging or patching materials, or overpacking. Appropriate protective equipment will be used.

- If it is inadvisable to approach the container, build a containment of absorbent materials and restrict access pending notification of the BED and implementation of the contingency plan.

- Contents of leaking containers may be transferred to appropriate non-leaking containers. Transfer procedures for fire safety will be followed for ignitable or reactive wastes (e.g., use of non-sparking tools, bonding and grounding of containers, isolation of ignition sources, and use of explosion-proof electrical equipment).

- Overpacked containers will be marked and labeled in the same manner as the contents. All containers of spill debris; recovered product, etc., will be managed in the same manner as waste containers received from outside the unit. Overpacks in use at the facility will be marked with information pertaining to their contents, and noting whether the container inside the overpack, is leaking or is in good condition.

#### 7.6.1.6 Dangerous/Mixed Waste Spill

The initial response to any emergency will be to immediately protect the health and safety of persons in the immediate area. Identification, containment, treatment, and disposal assessment will be the secondary response.

#### 7.6.1.7 Response to Minor Spills or Releases

Unit personnel will generally perform immediate cleanup of minor spills or releases using unit equipment, absorbents and emergency equipment noted in Section 7.10. Personnel detecting such spills or releases

shall contact the PNNL Single Point-of-Contact (375-2400) to notify of the detection of such release and arrange for notification of the BED. For spills or releases occurring within individual storage cells during routine handling and storage, refer to Chapter 4, Section 4.1.1.8 of the 305-B Storage Unit Part B Permit Application.

A spill or release of hazardous material or dangerous waste is considered "minor" if all of the following are true:

- The spill is minor in size (generally less than five gallons of liquid or 50 lbs. of solids);
- The composition of the material or waste is known or can be immediately determined from label, manifest, MSDS, or disposal request information;
- The spill does not threaten the health and safety of building occupants, i.e., an evacuation is not necessary;
- Unit personnel have received appropriate training in accordance with Chapter 8, Section 8.1.5 of the 305-B Storage Unit Permit Application; and
- Unit personnel have appropriate protective equipment, respiratory protection, and emergency response equipment to immediately respond and remediate the spill or release.

If any of the foregoing conditions are not met the provisions of Section 7.6.1.6.2., Major Dangerous Waste and/or RMW Spill or Material Release should be followed.

#### 7.6.1.7.1 Response to Major Dangerous Waste and/or RMW Spill or Material Release

The following actions will be taken in the event of a major release:

**Discoverer**

1. If within the unit, notify unit personnel of discovery of spill or release by sounding the fire alarm.
2. Immediately notify the PNNL Single Point-of-Contact (375-2400) and provide all known information, including:
   - Name(s) of chemical(s) involved and amount(s) spilled, on fire, or otherwise involved, or threatened by, the incident.
   - Name and callback phone number of person reporting the incident.
   - Location of spill or discharge (pinpoint as closely as possible).
   - Time incident began or was discovered.
   - Where the materials involved are going or may go, such as into secondary containment, under doors, through air ducts, etc.
   - Source and cause, if known, of spill or discharge.
   - Name(s) of anyone contaminated or injured in connection with the incident.
   - Any corrective actions in progress.
   - Anyone else who the caller has contacted.

3. Take action to contain and/or stop the spill if all of the following are true:

   - The identity of the substance(s) involved is known;
   - Appropriate protective equipment and control/cleanup supplies are immediately available;
   - The employee has the proper training and can perform the action(s) contemplated without assistance, or assistance is immediately available from other trained unit employees; and
   - Time is of the essence; i.e., the spill/discharge will get worse if immediate action is not taken.

If any of the above conditions are not met, or there is doubt, the employee should evacuate the area and remain outside the unit and upwind from it pending the arrival of the BED. He/she should remain available for consultation with the BED, HFD, or other emergency Management personnel.

**Single Point-of-Contact**

1. The Single Point-of-Contact will notify the BED or one of his alternates if the BED cannot be immediately reached, to arrange immediate response to the incident.
2. The Single Point-of-Contact will arrange for immediate response from HFD for fire or ambulance services as needed based on the report of the discoverer.
3. The Single Point-of-Contact will notify EMSD of the spill or release incident.
4. The Single Point-of-Contact will support the BED in providing further notification and coordination of response activities if needed. Potential activities requiring Single Point-of-Contact participation are:

   - Activate the general evacuation alarm for the 300 Area, if the BED determines that evacuation is necessary.
   - Notify the Emergency Operations Center (EOC) operated for DOE by Project Hanford Management Contractor (PHMC) if evacuation of the 300 Area or adjacent areas is necessary.
   - Notify the DOE-RL Emergency Operations Center in accordance with the Hanford Emergency Management Plan if necessary to evacuate areas lying outside the Hanford Site.
   - Any other activities found in the DOE-RL Hanford Emergency Management Plan.

**Building Emergency Director (BED) (or alternate)**

1. Go directly to the unit to coordinate further activity. Take command of the scene from discovering unit employee.
2. Obtain all immediately available information pertaining to the incident. Determine need for assistance from agencies and arrange for their mobilization and response through the Single Point-of-Contact.
3. If building evacuation is necessary, sound the fire alarm.
4. Arrange for care of any injured employees, and provide for any additional help necessary to safely evacuate any disabled staff or visitors.

5. If a threat to surrounding facilities/operations exists. The BED (or alternate) will identify the hazards and any appropriate actions needed in the case of an unplanned release and activate the Emergency Operations Center if required.

6. Provide for event notification in accordance with Section 7.3.2.6.

7. Maintain access control at the site by keeping unauthorized personnel and vehicles away from the area. Security personnel may be used to assist in site control if control of the boundary is difficult, e.g., repeated incursions. In determining controlled-access areas, be sure to consider environmental factors such as wind velocity and direction.

8. Remain available to fire, police, and other authorities on scene and provide all required information. If round-the-clock work is anticipated, enlist the assistance of alternate BEDs to provide coverage. Make no comment to media unless authorized to do so. Refer media inquiries to the Media Relations office.

9. If remediation is performed by unit personnel, ensure use of proper protective equipment, proper remedial techniques (including ignition source control for flammable spills), and decontamination procedures by all involved personnel. Consult a PNNL industrial hygienist for assistance in determining necessary equipment or procedures.

10. If remediation is performed by outside agencies such as the Hanford Hazardous Materials Response Team or other remedial contractors, remain at the site to oversee activities and provide information.

11. Ensure proper containerization, packaging, and labeling of recovered spill materials and overpacked containers.

12. Ensure decontamination (or restocking) and restoration of emergency equipment used in the spill remediation prior to resumption of unit operations in compliance with Chapter 12, Section 12.4.1.5.3 of the 305-B Storage Unit Part B Permit Application.

13. Provide reports after the incident in accordance with Chapter 12, Section 12.4.1.6. of the 305-B Storage Unit Part B Permit Application.

#### 7.6.1.8 Transportation and/or Packaging Incidents

- When a damaged shipment of hazardous material or dangerous waste arrives at 305-B Storage Unit, the shipment is unacceptable for receipt under the criteria identified in the 305-B Storage Unit Part B Permit Application.

- Treat any release from the package as a hazardous material spill and perform response actions per Section 7.6.1.6 Dangerous/Mixed Waste spill

- Do not move the shipment.

- Notify the generator of the damaged shipment and obtain any chemical information necessary to assist in the response.

#### 7.6.1.9 Unusual, Irritating, or Strong Odors

##### 7.6.1.9.1 Inside of the Facility

If an unusual, irritating, or strong odor is detected, and the person detecting it has reason to believe that the odor may be the result of an uncontrolled release of a toxic or dangerous material, they shall:

- Immediately activate the building fire alarm system to evacuate the building, and

- Notify the Single Point-of-Contact, the building manager, and cognizant line management.

In the event that the discoverer has knowledge of the source and scope of the release and believes that the release poses no immediate threat to others, the release shall immediately be reported to the building manager and to the discoverer's manager. Measures shall be taken to contain the release and ventilate the area, if safe and advisable to do so.

In the event that an unusual odor is detected within the facility, and the source of the odor is unknown, the BED must consider whether the facility should be evacuated.

#### 7.6.1.9.2 Outside of the Facility

If an unusual odor is detected and believed to come from outside the 305-B Building, the following actions should be taken:

- Notify 375-2400.
- Determine wind direction. The duty forecaster at 373-2716 can give the immediate wind direction in the 300 Area.
- Evacuate building to an upwind position regardless of primary designated Staging Area.
- In some cases it may be better to remain inside and shut down the HVAC System. The Building Emergency Director will determine response.

#### 7.6.1.10 Radiological Material Release

Same as Section 7.6.1.6., Dangerous/Mixed Waste Spill.

#### 7.6.1.11 Criticality

Not applicable.

### 7.6.2 Identification of Hazardous Materials in and around Facility

305-B Storage Unit contains both radioactive and hazardous wastes that pose a potential hazard to the public, adjacent facilities, personnel, programs and the environment. Facilities adjacent to 305-B Storage Unit may contain hazardous material typically found in an industrial facility including: chemical hazards such as corrosives, oxidizers, flammable solids and liquids, poisons, etc., radioactive materials, hazardous wastes, and radioactive mixed wastes. They also may contain industrial hazards such as high-voltage equipment, high-temperature equipment, high-speed equipment (such as drill presses, lathes, drive belts), and overhead hazards. However, none of these facilities pose an imminent threat to 305-B Storage Unit in the event of an emergency.

### 7.6.3 Natural Phenomena

Natural phenomena or events including range fire, flood, high winds/tornado, volcanic eruption/ashfall, seismic events, etc may occur at any time. Follow directions given by Crash Alarm Telephone or 305-B Storage Unit Building Emergency Director.

#### 7.6.3.1 Seismic Event

The 305-B Storage Unit is located in Benton County, Washington, and is not within one of the political jurisdictions identified in Appendix VI of Title 40 Code of Federal regulations (CFR) Part 264 (EPA 1988). Therefore, no further demonstration of compliance with the seismic standard is required.

#### 7.6.3.2 Volcanic Eruption/Ashfall

Follow directions given by Crash Alarm Telephone or 305-B Storage Unit Building Emergency Director.

#### 7.6.3.3 High Winds/Tornadoes

Follow directions given by Crash Alarm Telephone or 305-B Storage Unit Building Emergency Director.

#### 7.6.3.4 Flood

The 305-B Storage Unit is located in the 300 Area, which is adjacent to the Columbia River, approximately at river mile 345. Floods of the Columbia River were, therefore, considered for determining compliance with floodplain standards. Floods of other water bodies (i.e., the Yakima River, ephemeral streams on the Hanford Site) were not considered because of their great distance when compared to the distance to the Columbia River.

One hundred-year floodplain is identified in flood insurance rate maps developed by the Federal Emergency Management Agency (FEMA). The FEMA maps for Benton County, Washington, do not include the Hanford Site. Determination of whether 305-B Storage Unit is located in a 100-year floodplain, therefore, was made by comparing the land surface elevation at 305-B Storage Unit with the nearest downstream 100-year flood base elevation identified on the FEMA maps for Benton County. The nearest 100-year floodplain identified on the Benton County FEMA maps is at Columbia Point, approximately nine miles downstream of 305-B Storage Unit at river mile 336. The FEMA map for this area (FEMA 1982) identifies a 100-year flood base elevation of 352 ft above mean sea level (AMSL). This elevation is significantly below the elevation of 305-B Storage Unit, which is 387 ft AMSL (see topographic maps in Appendix 2A).

The potential for the 305-B Storage Unit to be inundated during a flood was also evaluated by comparison to the maximum probable flood for the Columbia River, which is greater than the 100-year flood level.

#### 7.6.3.5 Range Fire

Follow directions given by Crash Alarm Telephone or 305-B Storage Unit Building Emergency Director.

### 7.6.4 Security Contingencies

#### 7.6.4.1 Bomb Threats

- When condition is observed or bomb threat received, notify the PNNL Single Point-of-Contact 375-2400 or Building Emergency Director.
- If necessary, clear the area of personnel
- Do not move any suspicious objects
- Post warnings if applicable
- Provide Emergency Responders with Appropriate Information

If a Telephone Bomb Threat is received record the exact message and attempt to obtain the following information:

- When will it go off?
- Where is it located?
- What does it look like?

- What kind is it?
- Why was it placed?
- How do you know so much about it?
- Who put it there?
- Where are you calling from?
- What is your name and address?

**Note:** After receiving the information notify the PNNL Single Point-of-Contact 375-2400, give the information obtained from the caller and then notify the BED. If you receive a Written Bomb Threat, Notify the PNNL Single Point-of-Contact 375-2400 and provide the Written Bomb Threat to PNNL Security Personnel.

#### 7.6.4.2 Hostage Situation/Armed Intruder

- When condition is observed, notify the PNNL Single Point-of-Contact 375-2400 or Building Emergency Director.
- If necessary, clear the area of personnel
- Do not move any suspicious objects
- Post warnings if applicable
- Provide emergency responders with appropriate information
- Follow the instructions of the BED and/or security

### 7.7 Facility Take Cover – Shutdown of HVAC

If there is a potential for a hazardous plume to be drawn into the building -OR- if, the Patrol Operations Center (POC) directs securing the HVAC via the Single-Point of Contact for PNNL at 375-2400:

- The BED or Alternate BED will contact the Power Operator on duty and request that the building HVAC systems be secured for emergency protective actions.
- Notify the BED when HVAC shut down is complete.

#### 7.7.1 Local Shutdown Using Power Operator, BED, or Alternate BED

If there is a potential for a hazardous plume to be drawn into the building -OR- if, the Patrol Operations Center (POC) directs securing the HVAC via the Single Point-of-Contact for PNNL at 375-2400:

The BED or Alternate BED will contact the Power Operator on duty and request that the building HVAC System be secured for emergency protective actions.

If the power operator cannot respond to the Building, the BED or Alternate will shut down the two (one for the highbay and one for the office area) HVAC systems using the main disconnects located on the north wall in the 305-B Storage Unit highbay.

Notify the BED and the Power Operator when HVAC shut down is complete.

## 7.8 Utility Disconnects Locations

Utility disconnects may be necessary under extreme emergency conditions. The Building Emergency Director will determine if utility disconnects are necessary. Location of the utility disconnects or valves are described below:

### 7.8.1 Compressed Air

Plant air and shut off valves are located behind cell 5 in the southwest corner of the highbay area.

### 7.8.2 Sanitary and Process Water

Water lines and shut-off valves are located behind the bulking module in the southwest corner of the highbay area.

### 7.8.3 Main Electrical Power

There are three separate main electrical disconnects located in 305-B Storage Unit. One is located on the north wall of the highbay area. The second is located on the east wall of the lowbay area, and the third is located on the east wall in the original wing of the building, leading to the basement.

### 7.8.4 HVAC Systems

The main disconnects switches to the two HVAC systems (one for the highbay and one for the office area) are located on the north wall in the 305-B Storage Unit highbay.

## 7.9 Termination, Incident Recovery, and Restart

### 7.9.1 Termination

The Incident Commander in consultation with the 305-B Storage Unit Building Emergency Director will recommend termination of the event when conditions indicate that it is safe to do so.

### 7.9.2 Prevention of Recurrence or Spread of Fires, Explosions, or Releases

The BED is responsible for taking the steps necessary to ensure that a secondary release, fire, or explosion does not occur after the initial incident. Procedures that will be implemented may include:

- Inspection of containment for leaks, cracks, or other damage
- Inspection for toxic vapor generation
- Isolation of residual waste materials and debris
- Reactivation of adjacent operations in affected areas only after cleanup of residual waste materials is achieved

### 7.9.3 Recovery

A Recovery Team, consisting of the Incident Commander, 305-B Storage Unit Building Emergency Director, and appropriate representation of all facility interests, will develop and recommend a recovery plan. A recovery plan is needed following an event when further risk could be introduced to personnel, a facility, or the environment through recovery action and/or to maximize the preservation of evidence.

The recovery plan will be reviewed and approved by cognizant PNNL line management and EMSD staff, meeting the requirements of PNNL-MA-110, Section 9.0, Termination, Re-entry, and Recovery. Restart of operations must be performed in accordance with the approved plan. For emergencies not involving

activation of the Emergency Operations Center, the BED is responsible for ensuring that conditions are restored to normal before operations are resumed

### 7.9.3.1 Storage and Treatment of Released Material

Restart of operations after an emergency is conducted in accordance with established procedures for recovery from off-normal events. Treatment and/or storage and disposal of released material and contaminated debris is part of the recovery process leading to restart.

Immediately after an emergency, the BED or the recovery organization will make arrangements for the cleanup phase. Procedures for treatment, storage, and/or disposal of released material and contaminated debris are implemented at this time.

Released material and contaminated debris will be managed in the same manner as wastes received from outside the unit (see Chapter 4, Section 4.3 of the 305-B Storage Unit Part B Permit Application for procedures). All waste so generated will be containerized in drums or other appropriate containers and stored in an appropriate storage area pending analysis and determination of final treatment/disposal requirements. Unit operations personnel will take cleanup actions or other personnel meeting the training requirements of Chapter 8 of the 305-B Storage Unit Part B Permit Application. Actions to be taken may include, but are not limited to, any of the following.

- Neutralization of corrosive spills
- Chemical treatment of reactive materials to reduce hazard
- Overpacking or transfer of contents from leaking containers
- Using absorbents to contain and/or absorb leaking liquids for containerization and disposal
- Decontamination of solid surfaces impacted by released material, e.g., intact containers, facility equipment, floors, containment systems, etc.
- Disposal of contaminated porous materials which cannot be decontaminated, and any contaminated soil
- Containerization and sampling of recovered materials for classification and determination of proper disposal technique
- Follow up sampling of decontaminated surfaces to determine adequacy of cleanup techniques as appropriate.

Wastes from cleanup activities will be analyzed and stored in the same manner as are wastes received from outside the unit, in the manner prescribed in Chapter 4 of the 305-B Storage Unit Part B Permit Application. Incompatible wastes will not be placed in the same container. Containers of waste will be placed in storage areas appropriate for their compatibility class.

If it is determined that incompatibility of wastes was a factor in the incident, the BED or the recovery organization will ensure that the cause is corrected. Corrective examples would be modification of an incompatibility chart, or increased scrutiny of wastes from a generating unit (in accordance with Chapter 3, Section 3.2 of the 305-B Storage Unit Part B Permit Application) when incorrectly designated wastes caused or contributed to an incident.

### 7.9.3.2 Post-Emergency Equipment Maintenance

All equipment used during an incident will be decontaminated (if practicable) or disposed of as spill debris. Decontaminated equipment will be checked for proper operation prior to storage for subsequent

use. Consumables and disposed materials will be restocked in the quantities shown in the inventories of Section 7.10.4., Fire extinguishers will be recharged or replaced.

The BED is responsible to ensure that all equipment is cleaned and fit for its intended use prior to the resumption of operations. Depleted stocks of neutralizing and absorbing materials will be replenished, self-contained breathing apparatus (SCBAs) cleaned and refilled, protective clothing cleaned or disposed and restocked, etc. Notification of state and local authorities will be made through DOE-RL of completion of cleanup, decontamination and emergency equipment re-supply activities pursuant to WAC 173-303-360(2)(j). Upon notification and approval of PNNL line management, normal facility operations may be resumed.

### 7.9.4 Required Reports [G-8]

Three types of written post-incident reports, summarized below are required for incidents at the 305-B Storage Unit.

#### 7.9.4.1 Report to Ecology/EPA

Within 15 days of the incident, a written report will be submitted to Ecology concerning the incident. The report must include:

- Name, address, and telephone number of DOE-RL contact;
- Name, address, and telephone number of 305-B Storage Unit;
- Date, time, and type of incident (e.g., fire, explosion);
- Name and quantity of material(s) involved;
- The extent of any injuries;
- Assessment of any actual or potential hazards to human health or the environment caused by the incident;
- Estimated quantity and disposition of recovered material that resulted from the incident;
- Cause of the incident; and
- Description of corrective action taken to prevent recurrence of the incident.

#### 7.9.4.2 DOE Occurrence Reporting

Under DOE Order 232.1A and HFID 232.1B an occurrence report is required for incidents occurring at the 305-B Storage Unit involving hazardous materials release, fire, etc. Specific details of this reporting system are found in the Order. To summarize, the BED is responsible to file the following occurrence reports with DOE-RL under the Order:

- Within 24 hours of discovery, file a Notification Report.
- File an updated Occurrence Report whenever significant new information relating to the incident becomes available.
- File a final Occurrence Report when cause of the incident has been analyzed, root cause and contributing causes determined, corrective actions determined and scheduled, and "lessons learned" identified.

### 7.9.4.3 Off-Normal Event Reporting

Under off-normal event reporting procedures, occurrences shall be promptly investigated, reported, and analyzed to ensure that effective corrective actions are taken in compliance with contractual, statutory, and corporate requirements. All incidents are recorded in the building logbook. In the DOE reporting system, four levels of incidents are described in descending order of severity: emergency, unusual occurrence, off-normal occurrences, and logbook entry only.

An "off-normal event" is a significant deviation from normal operation that requires categorization and reporting as noted above. PNNL management is required to evaluate an event to determine the depth of investigation and level of reporting required.

Reporting of emergencies, unusual occurrences, and off-normal occurrences takes place as described under Section 7.9.3.2.

The BED is responsible for investigating each event in his/her area(s) of responsibility and submitting the appropriate report.

## 7.10 Emergency Equipment (crash alarm phones, fire extinguishers, etc.)

Support equipment available to assist in responding to an emergency can be found by referring to DOE/RL 94-02, Section 10.2, and the HFD emergency equipment listing in Appendix C of 94-02.

**Hanford Site Emergency Equipment**

The Hanford Site has fire and patrol personnel trained and equipped to respond in emergency situations. These personnel are employees of the site-operating contractor. The HFD Hazardous Material Response Team is trained for mobilization and control of hazardous material emergencies. The HFD will take control of the incident scene until the incident is under control and personnel rescue is complete

The Hanford Patrol provides support to the Fire Department during an incident, including such activities as activation of area crash alarm telephone systems or area sirens (for evacuation or take cover), access control, traffic control, and emergency notifications.

If an emergency threatens other facilities and/or there is a danger of release of hazardous materials to the environment, the HFD will respond. The HFD will coordinate protective response actions and notifications, and furnish any necessary technical assistance.

### 7.10.1 Portable Emergency Equipment

- Portable Fire Extinguishers are located throughout the facility. These locations are identified in Exhibit 7-1 "305-B Storage Unit Emergency Equipment Locations"

- A Mobile Command Post Vehicle can be obtained via HFD main telephone number (373-2230). The HFD Battalion Commander will approve and dispatch vehicle.

### 7.10.2 Communications equipment/warning systems

- Fire Alarm Pull Boxes are located at every exit throughout the facility. All locations are shown on Exhibit 7-1 "305-B Storage Unit Emergency Equipment Locations".

- The Crash Alarm Phone is located in the low-bay conference room area of the 305-B Storage Unit.

### 7.10.3 Personal Protective Equipment (PPE)

The unit has a safety shower and eyewash unit at each end of the high bay. Drainage from these units flows into the containment trenches. In addition to these units, a portable eyewash unit is maintained at the protective equipment storage area just outside the high bay, adjacent to the office area. These eyewash/shower units are inspected for clear and unobstructed accesses weekly in accordance with Chapter 6, Section 6.2 of the 305-B Storage Unit Part B Permit Application.

Protective clothing and respiratory protective equipment are maintained at the facility for use during both routine and emergency operations. This protective equipment includes at a minimum:

- 6 sets of chemically resistant suits, aprons, boots, and gloves
- 20 protective glasses
- 5 pair chemical goggles
- 4 face shields
- 4 full face respirators
- Respirator cartridges (variety)
- 3 self-contained breathing apparatus (30 minute type).

This protective equipment is stored in cabinets located outside of the high bay east entrance. Personnel assigned to 305-B Storage Unit are available to assist other trained personnel (e.g., firefighters) in emergency situations or possible immediately dangerous to life or health spill cleanup situations.

### 7.10.4 Spill Control and Containment Supplies

Supplies of absorbent pillows are located in the high bay operating area near the east entrance. These pillows absorb organic or inorganic materials and have a rated absorption capacity of approximately one-liter of waste each. They may be used for barriers to contain liquid spills as well as for absorbent purposes. The work area also has an ample supply of diatomaceous earth or vermiculite for absorption of liquid waste spills. Neutralizing absorbent is available for response to acid or caustic spills. A supply of empty drums (DOT UN1A1 closed head and DOT UN1A2 open head) and salvage drums (overpacks) is maintained in the high bay area along with brooms, shovels, and miscellaneous spill response supplies.

## 7.11 Evacuation of Persons with a Disability or Visitors

The 305-B Storage Unit has an evacuation plan, which includes emergency signal identification and staging area location. In the event an evacuation is required, 305-B Storage Unit personnel depart by one of the exit doors noted in Figure 7-2 and proceed through the north gate. Personnel are to assemble in the north parking lot Figure 7.3, Lane 2 accountability area for accounting. If the north gate is blocked by the emergency, personnel may escape through the Apple Street (west) gate opening to Stevens Drive or the south gate.

The safety of building visitors is the responsibility of the facility host, who shall ensure that visitors are provided a safe and orderly evacuation. The facility host will report the visitor status to the Staging Area Supervisor as soon, as is practical after the evacuation.

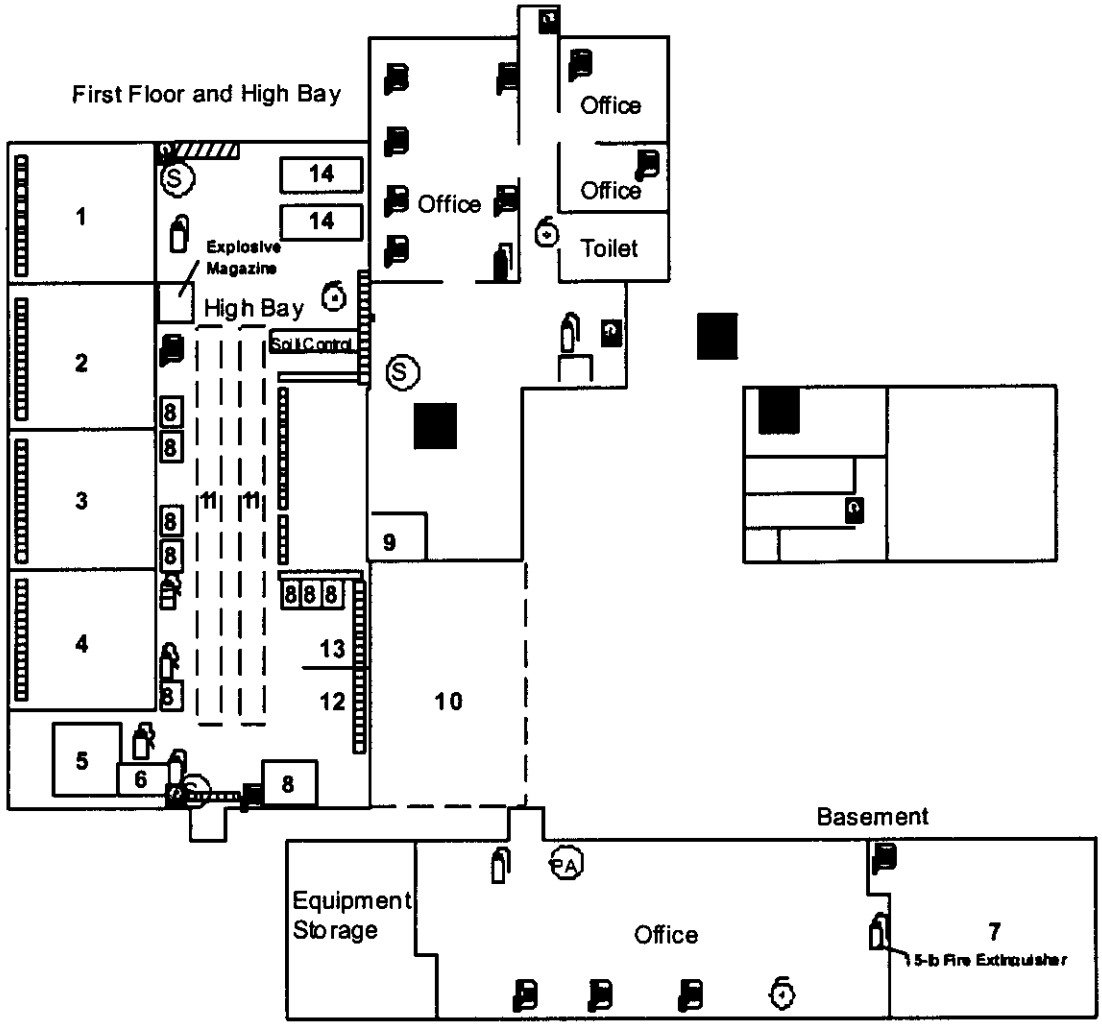
## 7.12 Exhibits

Exhibit 7.1 305-B Storage Units Emergency Equipment Location

Exhibit 7.2 305-B Storage Unit Building Evacuation Exits

Exhibit 7.3 305-B Storage Unit Evacuation Route

**Exhibit 7.1. 305-B Storage Unit Emergency Equipment Locations**




**Legend**

1. Acids, Oxidizers
2. Poisons, Class 9's
3. Alkalines, WSDW, Organic Peroxides
4. Organics and Compressed Aerosols
5. Flammable Liquid Bulking Module and compressed gases
6. Asbestos Cabinet
7. RMW Storage Cell
8. Flammable Storage
9. Small Quantity Flammable RMW
10. Outdoor Non-Regulated Drum Storage
11. WSDW/ORM/Non-Reg Drums
12. Oxidizer Drums
13. Acid Drums
14. Alkaline Drums

- Safety Shower/Eyewash
- Phone
- Fire Alarm Bell
- Fire Alarm Pull Box
- 14-lb Halon Fire Extinguisher
- 10-lb ABC Fire Extinguisher
- 15-lb Class D Fire Extinguisher
- Removable Access to Basement
- Emergency Equipment Cabinet
- Collection Sumps

**Exhibit 7.2. 305-B Storage Unit Building Evacuation Exits**

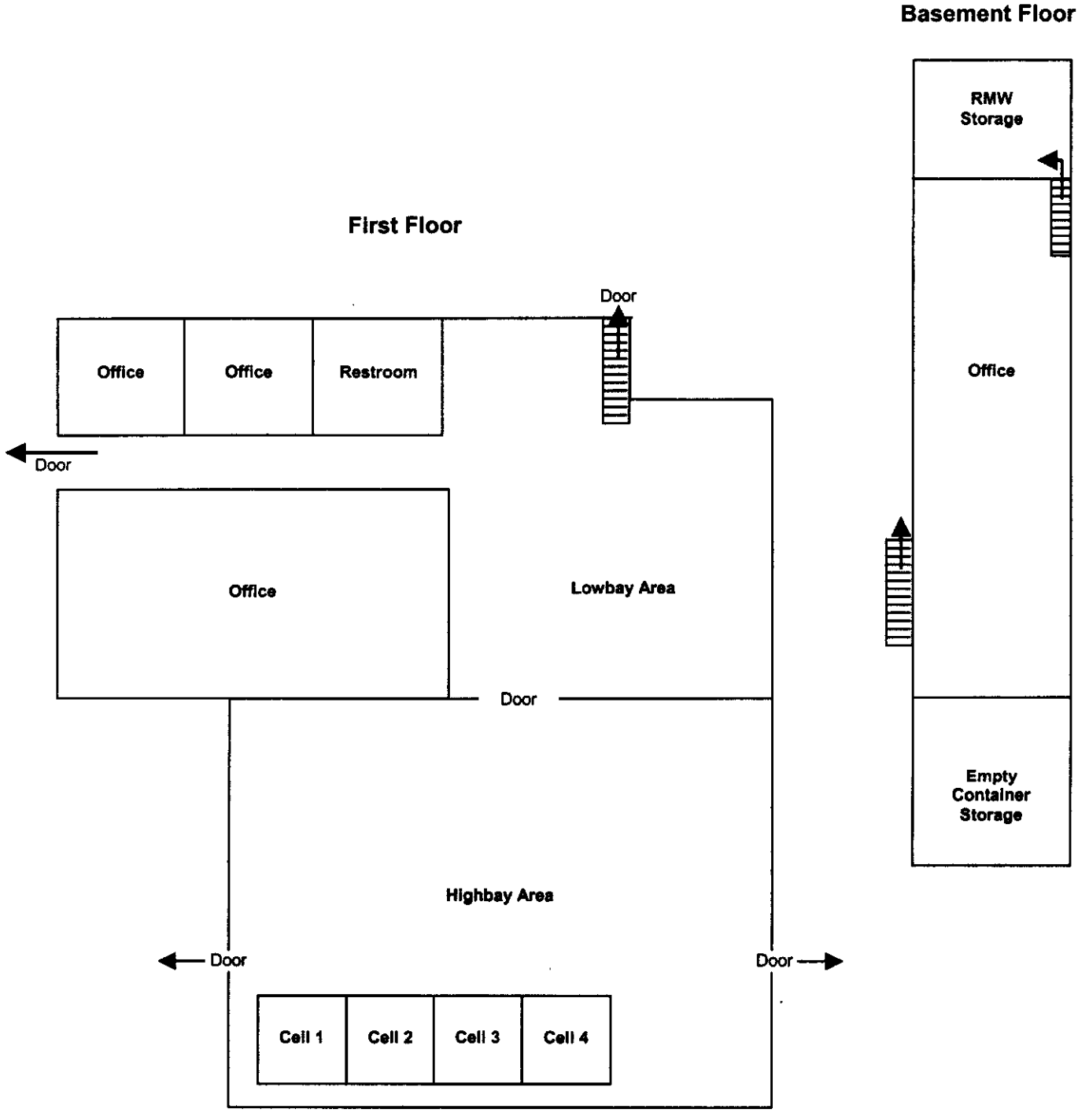
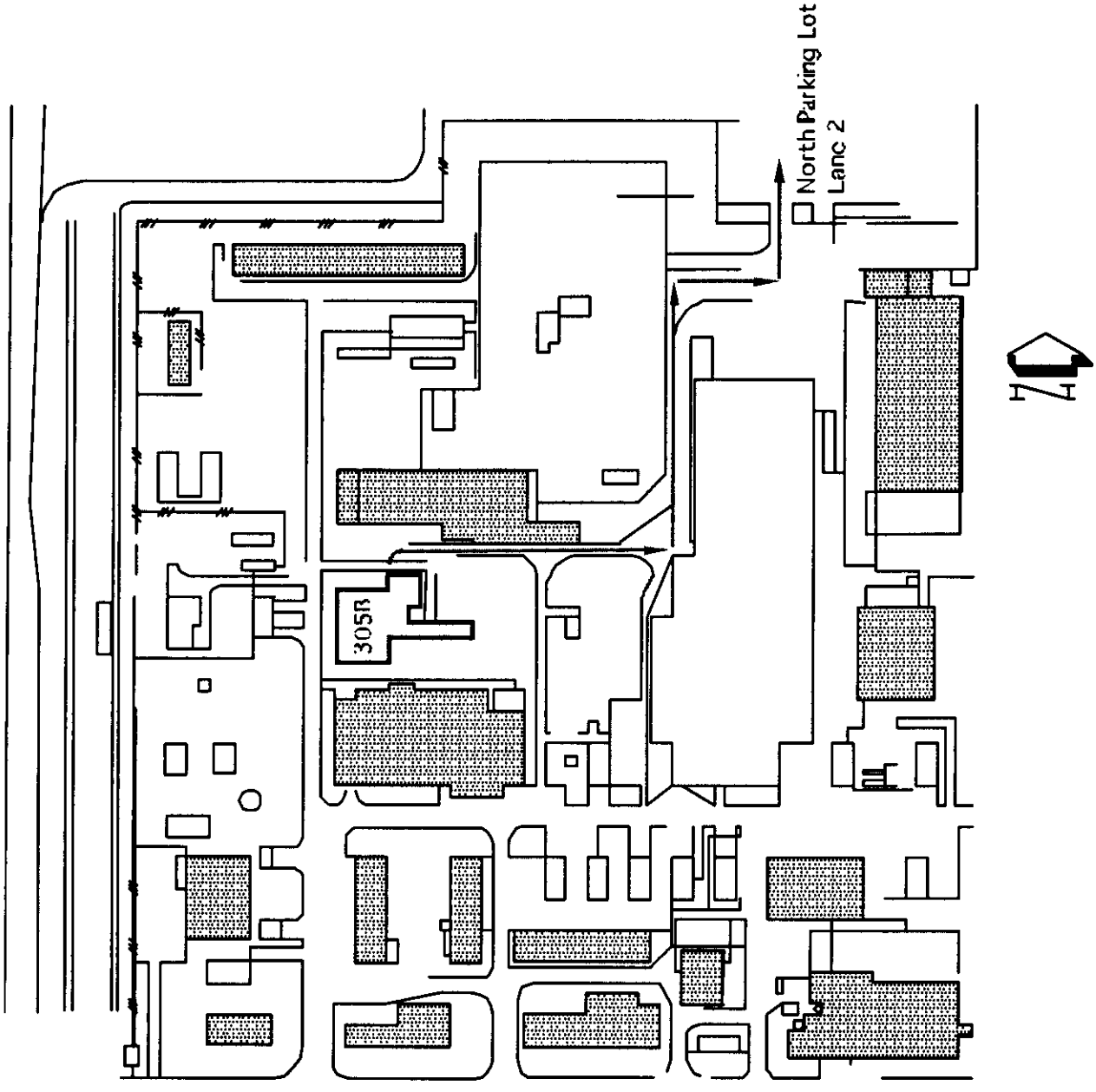


**Exhibit 7.3. 305-B Storage Unit Evacuation Route**



## 7.13 Distribution

Copies of the 305-B Storage Unit Building Emergency Procedures are maintained at the following locations:

- The 305-B Storage Unit
- HFD (300 Area Fire Station)
- The DOE-RL/ Emergency Operations Center, Federal Building, Richland
- The DOE-RL/Alternate Emergency Operations Center, 2420 Stevens Building, room 153
- All local police and fire departments, hospitals, and state and local response teams that may be called upon to provide emergency services.

# CONTENTS

# 1.0 PART A [A]

The following is the 325 Hazardous Waste Treatment Units (325 HWTUs) Part A, Form 3, history.

- Revision 0 of the Part A, Form 3, was submitted May 19, 1988.

- Revision 1 of the Part A, Form 3, submitted June 30, 1992.

- Revision 2 of the Part A, Form 3, March 1, 1993, more accurately defined the activities proposed to occur within the 325 portion (325 HWTU) of the 325/3100 Hazardous Waste Treatment Unit. Earlier revisions to the application limited the processes to be conducted in the 325 HWTU to stabilization and alkali metal treatments. The revised permit application specifies the treatments to be conducted in the 325 HWTU: pH adjustment, ion exchange, carbon absorption, oxidation, reduction, waste concentration by evaporation, precipitation, filtration, liquid/solids separation, catalytic destruction, grouting, encapsulation, and stabilization. Added waste codes inadvertently left out of Revision 1. Corrected the total storage capacity of the 325/3100 Hazardous Waste Treatment Unit to 5500 gallons to accurately reflect the combined storage capacity of both treatment portions. The storage capacity specified for the 325 HWTU was reduced from 1000 to 500 gallons.

- Revision 3 of the Part A, Form 3, December 2, 1994, deleted the 3100 Facility from the 325/3100 Hazardous Waste Treatment Unit Part A (Form 3) Permit Application. The 3100 facility project has no funding, no activities identified for it, and has never existed. Consolidated the 325 Shielded Analytical Laboratory (SAL) and activities under the 325 Hazardous Waste Treatment Unit Part A (Form 3). The 325 SAL was operating under Physical/Chemical Treatment Facilities Part A (Form 3). This action allowed the Pacific Northwest Laboratory (PNL) and the U.S. Department of Energy, Richland Operation Office (RL) to consolidate similar 325 Building activities under the same management within the same Part A (Form 3) and eventually the same Part B permit application.

- Revision 4 of the Part A, Form 3, submitted June 30, 1997, addressed close out of the Notice of Intent (NOI) process that began in 1995 for the HWTUs and gained interim status for the portions of the facility named in Revision 4. Acquisition of interim status by July 29, 1997, was necessary to assure that further extensions or other actions to authorize storage of mixed waste in the HWTUs, specifically tank TK-1, was not needed from the State of Washington Department of Ecology (Ecology). The 45-day NOI comment period was complete July 24, 1997 and per WAC 173-303-281(3)(b), submittal of the revised Form 3 was appropriate at that time. Revision 4 of Form 3, submitted to DOE RL STO on July 24 stated the Revision 4 provided the 325 Building with tank storage capability, which will eliminate that facility's dependency on the 300 Area Radioactive Liquid Waste System for disposal of liquid radioactive or mixed waste. It also provided conforming changes to the quantities and types of waste managed.

- Revision 4A of the Part A, Form 3, dated June 30, 2000, addresses the installation of the Radioactive Liquid Waste Tank (RLWT) system.

| FORM 3 | DANGEROUS WASTE PERMIT APPLICATION | I. EPA/State I.D.. No. |
|---|---|---|
| | | W A 7 8 9 0 0 0 8 9 6 7 |

**FOR OFFICIAL USE ONLY**

| Application Approved | Date Received (month/ day / year) | Comments |
|---|---|---|
| | | |

## II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below (mark one box only) to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA/STATE I.D. Number, or If this is a revised application, enter your facility's EPA/STATE I.D. Number in Section I above.

**A. First Application** (place an "X" below and provide the appropriate date)

☐ **1. Existing Facility** (See instructions for definition of "existing" facility. Complete item below.)

| MO | DAY | YEAR |
|---|---|---|
| 03 | 22 | 1943 |

*For existing facilities, provide the date (mo/day/yr) operation began or the date construction commenced. (Use the boxes to the left.)

*The date construction of the Hanford Facility commenced

☐ **2. New Facility** (Complete item below.)

| MO | DAY | YEAR |
|---|---|---|
| | | |

For new facilities, provide the date (mo/day/yr) operation began or is expected to begin

**B. Revised Application** (Place an "X" below and complete Section I above)

☒ **1. Facility has an interim Status Permit**

☒ **2. Facility has a Final Permit**

## III. PROCESSES – CODES AND CAPACITIES

**A. Process Code** – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the codes(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process (including its design capacity) in the space provided on the (Section III-C).

**B. Process Design Capacity** – For each code entered in column A enter the capacity of the process.

1. Amount – Enter the amount.
2. Unit of Measure – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

| PROCESS | PROCESS CODE | APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY |
|---|---|---|
| **STORAGE:** | | |
| Container (barrel, drum, etc.) | S01 | Gallons or liters |
| Tank | S02 | Gallons or liters |
| Waste pile | S03 | Cubic yards or cubic meters |
| Surface impoundment | S04 | Gallons or liters |
| **DISPOSAL:** | | |
| Injection well | D80 | Gallons or liters |
| Landfill | D81 | Acre-feet (the volume that would cover one acre to a Depth of one foot) or hectare-meter |
| Land application | D82 | Acres or hectares |
| Ocean disposal | D83 | Gallons per day or liters per day |
| Surface impoundment | D84 | Gallons or liters |
| **TREATMENT:** | | |
| Tank | T01 | Gallons per day or liters per day |
| Surface impoundment | T02 | Gallons per day or liters per day |
| Incinerator | T03 | Tons per hour or metric tons per hour; gallons per hour or liters per hour |
| Other (use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Section III-C.) | T04 | Gallons per day or liters per day |

| Unit of Measure | Unit of Measure Code |
|---|---|
| ·llons | G |
| ers | L |
| Cubic Yards | Y |
| Cubic Meters | C |
| Gallons Per Day | U |

| Unit of Measure | Unit of Measure Code |
|---|---|
| Liters Per Day | V |
| Tons Per Hour | D |
| Metric Tons Per Hour | W |
| Gallons Per Hour | E |
| Liters Per Hour | H |

| Unit of Measure | Unit of Measure Code |
|---|---|
| Acre-Feet | A |
| Hectare-Meter | F |
| Acres | B |
| Hectares | Q |

**III. PROCESS – CODES AND DESIGN CAPACITIES** (continued)

**Example for Completing Section III** (shown in line numbers X-1 and X-2 below): A facility has two storage tanks; one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

| Line No. | A. Process Code *(from list above)* | | | B. process Design Capacity | | | | For Official Use Only | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1. Amount *(Specify)* | 2. Unit of Measure *(enter code)* | | | | | | |
| X-1 | S | 0 | 2 | 600 | | G | | | | | |
| X-2 | T | 0 | 3 | 20 | | E | | | | | |
| 1 | S | 0 | 1 | 10,000 | | L | | | | | |
| 2 | T | 0 | 4 | 1,514 | | V | | | | | |
| 3 | S | 0 | 2 | 12,574 | | L | | | | | |
| 4 | T | 0 | 1 | 12,574 | | V | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |

**C. Space for additional process codes or for describing other process (code "T04"). For each process entered here include design capacity.**

S01, T04, S02, T01

The 325 Hazardous Waste Treatment Units (325 HWTUs) consist of the Shielded Analytical Laboratory (SAL) which includes Rooms 32, 200, 201, 202, and 203; the Hazardous Waste Treatment Unit (HWTU) encompassing Rooms 520 and 528 of the 325 Building, and the 325 Radioactive Liquid Waste Tank (RLWT) located in the southeast corner of the basement of the 325 Building. The 325 HWTUs began waste management operations in 1991 (SAL) and 1995 (HWTU). Up to 10,000 liters of dangerous and/or mixed waste may be stored in containers in the 325 HWTUs (S01). A maximum of 1514 liters of dangerous and/or mixed waste may be treated per day in containers in the 325 HWTUs (T04).

Liquid dangerous and/or mixed waste is transferred to tank storage via gravity drain lines located in the SAL (which drain into tank TK-1) and in Room 528 [which drain directly to the radioactive liquid waste system (RLWS)]. Tank TK-1 is drained via a jet system into the RLWS then to the RLWT and is used to collect liquid dangerous and/or mixed waste. The RLWT transfers collected liquid dangerous and/or mixed waste to a loadout station, where mobile containers are loaded to transfer the liquid dangerous and/or mixed waste to the Double-Shell Tank System. A maximum of 12,574 liters of dangerous and/or mixed waste may be stored in tanks in the 325 HWTUs (S02). A maximum of 12,574 liters of dangerous and/or mixed waste may be treated in tanks per day in the 325 HWTUs (T01).

Dangerous and/or mixed waste treatments are generally conducted as small bench-scale operations except for in-tank treatments. Treatment processes utilized at the 325 HWTUs may include the following:

| | | | | | |
|---|---|---|---|---|---|
| T11 | Molten salt destructor | T35 | Centrifugation | T55 | Electrodialysis |
| T12 | Pyrolysis | T36 | Clarification | T56 | Electrolysis |
| T13 | Wet air oxidation | T37 | Coagulation | T57 | Evaporation |
| T14 | Calcination | T38 | Decanting | T58 | High gradient magnetic separation |
| T15 | Microwave discharge | T39 | Encapsulation | T59 | Leaching |
| T18 | Other thermal treatment | T40 | Filtration | T60 | Liquid ion exchange |
| T21 | Chemical fixation | T41 | Flocculation | T61 | Liquid-liquid extraction |
| T22 | Chemical oxidation | T42 | Flotation | T62 | Reverse osmosis |
| T23 | Chemical precipitation | T43 | Foaming | T63 | Solvent recovery |
| T24 | Chemical reduction | T44 | Sedimentation | T64 | Stripping |
| T25 | Chlorination | T45 | Thickening | T65 | Sand filter |
| T26 | Chlorinolysis | T46 | Ultrafiltration | T66 | Other removal technology |
| T27 | Cyanide destruction | T47 | Other separation technology | T67 | Activated sludge |
| T28 | Degradation | T48 | Absorption-molecular sieve | T69 | Aerobic tank |
| T29 | Detoxification | T49 | Activated carbon | T70 | Anaerobic lagoon or tank |
| T30 | Ion exchange | T50 | Blending | T71 | Composting |
| T31 | Neutralization | T51 | Catalysis | T74 | Thickening filter |
| T32 | Ozonation | T52 | Crystallization | T75 | Trickling filter |
| T33 | Photolysis | T53 | Dialysis | T77 | Other biological treatment |
| T34 | Other chemical treatment | T54 | Distillation | | |

## IV. DESCRIPTION OF DANGEROUS WASTES

**A. Dangerous Waste Number** – Enter the digit number from Chapter 173-303 WAC for each listed dangerous waste you will handle. If you handle dangerous wastes which are not listed in Chapter 173-303 WAC, enter the four-digit number(s) that describes the characteristics and/or the toxic contaminants of those dangerous wastes.

**B. Estimated Annual Quantity** - For each listed waste entered in column A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

**C. Unit of Measure** - For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate odes are:

| ENGLISH UNIT OF MEASURE | CODE | METRIC UNIT OF MEASURE | CODE |
|---|---|---|---|
| Pounds | P | Kilograms | K |
| Tons | T | Metric Tons | M |

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

**D. Processes**

1. Process Codes:

   For listed dangerous waste: For each listed dangerous waste entered in column A select the code(s) from the list of process codes contained in Section III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

   For non-listed dangerous wastes: For each characteristic or toxic contaminant entered in Column A, select the code(s) from the list of process codes contained in Section III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed dangerous wastes that possess that characteristic or toxic contaminant.

   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. Process Description: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: DANGEROUS WASTES DESCRIBED BY MORE THAN ONE DANGEROUS WASTE NUMBER - Dangerous wastes that can be described by more than one Waste Number shall be described on the form as follows:

1. Select one of the Dangerous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other Dangerous Waste Number that can be used to describe the waste. In column D(2) on that line enter "Included with above" and make no other entries on that line.
3. Repeat step 2 for each other Dangerous Waste Number that can be used to describe the dangerous waste.

Example for completing Section IV (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste.

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| X-1 | K | 0 | 5 | 4 | 900 | | P | | T03 | D80 | | | |
| X-2 | D | 0 | 0 | 2 | 400 | | P | | T03 | D80 | | | |
| X-3 | D | 0 | 0 | 1 | 100 | | P | | T03 | D80 | | | |
| X-4 | D | 0 | 0 | 2 | | | | | T03 | D80 | | | *Included with above* |

Photocopy this page before completing if you have more than 26 wastes to list.

| I.D. Number *(enter from page 1)* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| W | A | 7 | 8 | 9 | 0 | 0 | 0 | 8 | 9 | 6 | 7 |

## IV. DESCRIPTION OF DANGEROUS WASTES *(continued)*

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| 1 | D | 0 | 0 | 1 | 82,500* *[60,000 (S01); 22,500 (T04)] | K | | | S01 | T04 | | | Storage-Container/Treatment-Other |
| 2 | D | 0 | 0 | 2 | | | | | | | | | |
| 3 | D | 0 | 0 | 3 | | | | | | | | | |
| 4 | D | 0 | 0 | 4 | | | | | | | | | |
| 5 | D | 0 | 0 | 5 | | | | | | | | | |
| 6 | D | 0 | 0 | 6 | | | | | | | | | |
| 7 | D | 0 | 0 | 7 | | | | | | | | | |
| 8 | D | 0 | 0 | 8 | | | | | | | | | |
| 9 | D | 0 | 0 | 9 | | | | | | | | | |
| 10 | D | 0 | 1 | 0 | | | | | | | | | |
| 11 | D | 0 | 1 | 1 | | | | | | | | | |
| 12 | D | 0 | 1 | 2 | | | | | | | | | |
| 13 | D | 0 | 1 | 3 | | | | | | | | | |
| 14 | D | 0 | 1 | 4 | | | | | | | | | |
| 15 | D | 0 | 1 | 5 | | | | | | | | | |
| 16 | D | 0 | 1 | 6 | | | | | | | | | |
| 17 | D | 0 | 1 | 7 | | | | | | | | | |
| 18 | D | 0 | 1 | 8 | | | | | | | | | |
| 19 | D | 0 | 1 | 9 | | | | | | | | | |
| 20 | D | 0 | 2 | 0 | | | | | | | | | |
| 21 | D | 0 | 2 | 1 | | | | | | | | | |
| 22 | D | 0 | 2 | 2 | | | | | | | | | |
| 23 | D | 0 | 2 | 3 | | | | | | | | | |
| 24 | D | 0 | 2 | 4 | | | | | | | | | |
| 25 | D | 0 | 2 | 5 | | | | | | | | | |
| 26 | D | 0 | 2 | 6 | | | | | | | | | |
| 27 | D | 0 | 2 | 7 | | | | | | | | | |
| 28 | D | 0 | 2 | 8 | | | | | | | | | |
| 29 | D | 0 | 2 | 9 | | | | | | | | | |
| 30 | D | 0 | 3 | 0 | | | | | | | | | |
| 31 | D | 0 | 3 | 1 | | | | | | | | | |
| 32 | D | 0 | 3 | 2 | | | | | | | | | |
| 33 | D | 0 | 3 | 3 | | | | | | | | | |
| 34 | D | 0 | 3 | 4 | | | | | | | | | |
| 35 | D | 0 | 3 | 5 | | | | | | | | | |
| 36 | D | 0 | 3 | 6 | | | | | | | | | |
| 37 | D | 0 | 3 | 7 | | | | | | | | | |
| 38 | D | 0 | 3 | 8 | | | | | | | | | |
| 39 | D | 0 | 3 | 9 | | | | | | | | | |
| 40 | D | 0 | 4 | 0 | | | | | | | | | |
| 41 | D | 0 | 4 | 1 | | | | | | | | | |
| 42 | D | 0 | 4 | 2 | | | | | | | | | |
| 43 | D | 0 | 4 | 3 | | | | | | | | | |
| 44 | F | 0 | 0 | 1 | | | | | | | | | |
| 45 | F | 0 | 0 | 2 | | | | | | | | | |

Photocopy this page before completing if you have more than 26 wastes to list.

| I.D. Number *(enter from page 1)* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| W | A | 7 | 8 | 9 | 0 | 0 | 0 | 8 | 9 | 6 | 7 |

## IV. DESCRIPTION OF DANGEROUS WASTES *(continued)*

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| 46 | F | 0 | 0 | 3 | | | | | | | | | |
| 47 | F | 0 | 0 | 4 | | | | | | | | | |
| 48 | F | 0 | 0 | 5 | | | | | | | | | |
| 49 | F | 0 | 2 | 7 | | | | | | | | | |
| 50 | F | 0 | 3 | 9 | | | | | | | | | |
| 51 | K | 0 | 1 | 1 | | | | | | | | | |
| 52 | K | 0 | 1 | 3 | | | | | | | | | |
| 53 | K | 0 | 4 | 8 | | | | | | | | | |
| 54 | K | 0 | 4 | 9 | | | | | | | | | |
| 55 | K | 0 | 5 | 0 | | | | | | | | | |
| 56 | K | 0 | 5 | 1 | | | | | | | | | |
| 57 | K | 0 | 5 | 2 | | | | | | | | | |
| 58 | P | 0 | 0 | 1 | | | | | | | | | |
| 59 | P | 0 | 0 | 2 | | | | | | | | | |
| 60 | P | 0 | 0 | 3 | | | | | | | | | |
| 61 | P | 0 | 0 | 4 | | | | | | | | | |
| 62 | P | 0 | 0 | 5 | | | | | | | | | |
| 63 | P | 0 | 0 | 6 | | | | | | | | | |
| 64 | P | 0 | 0 | 7 | | | | | | | | | |
| 65 | P | 0 | 0 | 8 | | | | | | | | | |
| 66 | P | 0 | 0 | 9 | | | | | | | | | |
| 67 | P | 0 | 1 | 0 | | | | | | | | | |
| 68 | P | 0 | 1 | 1 | | | | | | | | | |
| 69 | P | 0 | 1 | 2 | | | | | | | | | |
| 70 | P | 0 | 1 | 3 | | | | | | | | | |
| 71 | P | 0 | 1 | 4 | | | | | | | | | |
| 72 | P | 0 | 1 | 5 | | | | | | | | | |
| 73 | P | 0 | 1 | 6 | | | | | | | | | |
| 74 | P | 0 | 1 | 7 | | | | | | | | | |
| 75 | P | 0 | 1 | 8 | | | | | | | | | |
| 76 | P | 0 | 2 | 0 | | | | | | | | | |
| 77 | P | 0 | 2 | 1 | | | | | | | | | |
| 78 | P | 0 | 2 | 2 | | | | | | | | | |
| 79 | P | 0 | 2 | 3 | | | | | | | | | |
| 80 | P | 0 | 2 | 4 | | | | | | | | | |
| 81 | P | 0 | 2 | 6 | | | | | | | | | |
| 82 | P | 0 | 2 | 7 | | | | | | | | | |
| 83 | P | 0 | 2 | 8 | | | | | | | | | |
| 84 | P | 0 | 2 | 9 | | | | | | | | | |
| 85 | P | 0 | 3 | 0 | | | | | | | | | |
| 86 | P | 0 | 3 | 1 | | | | | | | | | |
| 87 | P | 0 | 3 | 3 | | | | | | | | | |
| 88 | P | 0 | 3 | 4 | | | | | | | | | |
| 89 | P | 0 | 3 | 6 | | | | | | | | | |
| 90 | P | 0 | 3 | 7 | | | | | | | | | |
| 91 | P | 0 | 3 | 8 | | | | | | | | | |

Photocopy this page before completing if you have more than 26 wastes to list.

| I.D. Number *(enter from page 1)* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| W | A | 7 | 8 | 9 | 0 | 0 | 0 | 8 | 9 | 6 | 7 |

**IV. DESCRIPTION OF DANGEROUS WASTES *(continued)***

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| 92 | P | 0 | 3 | 9 | | | | | | | | | |
| 93 | P | 0 | 4 | 0 | | | | | | | | | |
| 94 | P | 0 | 4 | 1 | | | | | | | | | |
| 95 | P | 0 | 4 | 2 | | | | | | | | | |
| 96 | P | 0 | 4 | 3 | | | | | | | | | |
| 97 | P | 0 | 4 | 4 | | | | | | | | | |
| 98 | P | 0 | 4 | 5 | | | | | | | | | |
| 99 | P | 0 | 4 | 6 | | | | | | | | | |
| 100 | P | 0 | 4 | 7 | | | | | | | | | |
| 101 | P | 0 | 4 | 8 | | | | | | | | | |
| 102 | P | 0 | 4 | 9 | | | | | | | | | |
| 103 | P | 0 | 5 | 0 | | | | | | | | | |
| 104 | P | 0 | 5 | 1 | | | | | | | | | |
| 105 | P | 0 | 5 | 4 | | | | | | | | | |
| 106 | P | 0 | 5 | 6 | | | | | | | | | |
| 107 | P | 0 | 5 | 7 | | | | | | | | | |
| 108 | P | 0 | 5 | 8 | | | | | | | | | |
| 109 | P | 0 | 5 | 9 | | | | | | | | | |
| 110 | P | 0 | 6 | 0 | | | | | | | | | |
| 111 | P | 0 | 6 | 2 | | | | | | | | | |
| 112 | P | 0 | 6 | 3 | | | | | | | | | |
| 113 | P | 0 | 6 | 4 | | | | | | | | | |
| 114 | P | 0 | 6 | 5 | | | | | | | | | |
| 115 | P | 0 | 6 | 6 | | | | | | | | | |
| 116 | P | 0 | 6 | 7 | | | | | | | | | |
| 117 | P | 0 | 6 | 8 | | | | | | | | | |
| 118 | P | 0 | 6 | 9 | | | | | | | | | |
| 119 | P | 0 | 7 | 0 | | | | | | | | | |
| 120 | P | 0 | 7 | 1 | | | | | | | | | |
| 121 | P | 0 | 7 | 2 | | | | | | | | | |
| 122 | P | 0 | 7 | 3 | | | | | | | | | |
| 123 | P | 0 | 7 | 4 | | | | | | | | | |
| 124 | P | 0 | 7 | 5 | | | | | | | | | |
| 125 | P | 0 | 7 | 6 | | | | | | | | | |
| 126 | P | 0 | 7 | 7 | | | | | | | | | |
| 127 | P | 0 | 7 | 8 | | | | | | | | | |
| 128 | P | 0 | 8 | 1 | | | | | | | | | |
| 129 | P | 0 | 8 | 2 | | | | | | | | | |
| 130 | P | 0 | 8 | 4 | | | | | | | | | |
| 131 | P | 0 | 8 | 5 | | | | | | | | | |
| 132 | P | 0 | 8 | 7 | | | | | | | | | |
| 133 | P | 0 | 8 | 8 | | | | | | | | | |
| 134 | P | 0 | 8 | 9 | | | | | | | | | |
| 135 | P | 0 | 9 | 2 | | | | | | | | | |
| 136 | P | 0 | 9 | 3 | | | | | | | | | |
| 137 | P | 0 | 9 | 4 | | | | | | | | | |

Photocopy this page before completing if you have more than 26 wastes to list.

| I.D. Number *(enter from page 1)* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| W | A | 7 | 8 | 9 | 0 | 0 | 0 | 8 | 9 | 6 | 7 |

## IV. DESCRIPTION OF DANGEROUS WASTES *(continued)*

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| 138 | P | 0 | 9 | 5 | | | | | | | | | |
| 139 | P | 0 | 9 | 6 | | | | | | | | | |
| 140 | P | 0 | 9 | 7 | | | | | | | | | |
| 141 | P | 0 | 9 | 8 | | | | | | | | | |
| 142 | P | 0 | 9 | 9 | | | | | | | | | |
| 143 | P | 1 | 0 | 1 | | | | | | | | | |
| 144 | P | 1 | 0 | 2 | | | | | | | | | |
| 145 | P | 1 | 0 | 3 | | | | | | | | | |
| 146 | P | 1 | 0 | 4 | | | | | | | | | |
| 147 | P | 1 | 0 | 5 | | | | | | | | | |
| 148 | P | 1 | 0 | 6 | | | | | | | | | |
| 149 | P | 1 | 0 | 8 | | | | | | | | | |
| 150 | P | 1 | 0 | 9 | | | | | | | | | |
| 151 | P | 1 | 1 | 0 | | | | | | | | | |
| 152 | P | 1 | 1 | 1 | | | | | | | | | |
| 153 | P | 1 | 1 | 2 | | | | | | | | | |
| 154 | P | 1 | 1 | 3 | | | | | | | | | |
| 155 | P | 1 | 1 | 4 | | | | | | | | | |
| 156 | P | 1 | 1 | 5 | | | | | | | | | |
| 157 | P | 1 | 1 | 6 | | | | | | | | | |
| 158 | P | 1 | 1 | 8 | | | | | | | | | |
| 159 | P | 1 | 1 | 9 | | | | | | | | | |
| 160 | P | 1 | 2 | 0 | | | | | | | | | |
| 161 | P | 1 | 2 | 1 | | | | | | | | | |
| 162 | P | 1 | 2 | 2 | | | | | | | | | |
| 163 | P | 1 | 2 | 3 | | | | | | | | | |
| 164 | P | 1 | 2 | 7 | | | | | | | | | |
| 165 | P | 1 | 2 | 8 | | | | | | | | | |
| 166 | P | 1 | 8 | 5 | | | | | | | | | |
| 167 | P | 1 | 8 | 8 | | | | | | | | | |
| 168 | P | 1 | 8 | 9 | | | | | | | | | |
| 169 | P | 1 | 9 | 0 | | | | | | | | | |
| 170 | P | 1 | 9 | 2 | | | | | | | | | |
| 171 | P | 1 | 9 | 4 | | | | | | | | | |
| 172 | P | 1 | 9 | 6 | | | | | | | | | |
| 173 | P | 1 | 9 | 7 | | | | | | | | | |
| 174 | P | 1 | 9 | 8 | | | | | | | | | |
| 175 | P | 1 | 9 | 9 | | | | | | | | | |
| 176 | P | 2 | 0 | 1 | | | | | | | | | |
| 177 | P | 2 | 0 | 2 | | | | | | | | | |
| 178 | P | 2 | 0 | 3 | | | | | | | | | |
| 179 | P | 2 | 0 | 4 | | | | | | | | | |
| 180 | P | 2 | 0 | 5 | | | | | | | | | |
| 181 | U | 0 | 0 | 1 | | | | | | | | | |
| 182 | U | 0 | 0 | 2 | | | | | | | | | |
| 183 | U | 0 | 0 | 3 | | | | | | | | | |

Photocopy this page before completing if you have more than 26 wastes to list.

| I.D. Number *(enter from page 1)* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| W | A | 7 | 8 | 9 | 0 | 0 | 0 | 8 | 9 | 6 | 7 |

**IV. DESCRIPTION OF DANGEROUS WASTES *(continued)***

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| 184 | U | 0 | 0 | 4 | | | | | | | | | |
| 185 | U | 0 | 0 | 5 | | | | | | | | | |
| 186 | U | 0 | 0 | 6 | | | | | | | | | |
| 187 | U | 0 | 0 | 7 | | | | | | | | | |
| 188 | U | 0 | 0 | 8 | | | | | | | | | |
| 189 | U | 0 | 0 | 9 | | | | | | | | | |
| 190 | U | 0 | 1 | 0 | | | | | | | | | |
| 191 | U | 0 | 1 | 1 | | | | | | | | | |
| 192 | U | 0 | 1 | 2 | | | | | | | | | |
| 193 | U | 0 | 1 | 4 | | | | | | | | | |
| 194 | U | 0 | 1 | 5 | | | | | | | | | |
| 195 | U | 0 | 1 | 6 | | | | | | | | | |
| 196 | U | 0 | 1 | 7 | | | | | | | | | |
| 197 | U | 0 | 1 | 8 | | | | | | | | | |
| 198 | U | 0 | 1 | 9 | | | | | | | | | |
| 199 | U | 0 | 2 | 0 | | | | | | | | | |
| 200 | U | 0 | 2 | 1 | | | | | | | | | |
| 201 | U | 0 | 2 | 2 | | | | | | | | | |
| 202 | U | 0 | 2 | 3 | | | | | | | | | |
| 203 | U | 0 | 2 | 4 | | | | | | | | | |
| 204 | U | 0 | 2 | 5 | | | | | | | | | |
| 205 | U | 0 | 2 | 6 | | | | | | | | | |
| 206 | U | 0 | 2 | 7 | | | | | | | | | |
| 207 | U | 0 | 2 | 8 | | | | | | | | | |
| 208 | U | 0 | 2 | 9 | | | | | | | | | |
| 209 | U | 0 | 3 | 0 | | | | | | | | | |
| 210 | U | 0 | 3 | 1 | | | | | | | | | |
| 211 | U | 0 | 3 | 2 | | | | | | | | | |
| 212 | U | 0 | 3 | 3 | | | | | | | | | |
| 213 | U | 0 | 3 | 4 | | | | | | | | | |
| 214 | U | 0 | 3 | 5 | | | | | | | | | |
| 215 | U | 0 | 3 | 6 | | | | | | | | | |
| 216 | U | 0 | 3 | 7 | | | | | | | | | |
| 217 | U | 0 | 3 | 8 | | | | | | | | | |
| 218 | U | 0 | 3 | 9 | | | | | | | | | |
| 219 | U | 0 | 4 | 1 | | | | | | | | | |
| 220 | U | 0 | 4 | 2 | | | | | | | | | |
| 221 | U | 0 | 4 | 3 | | | | | | | | | |
| 222 | U | 0 | 4 | 4 | | | | | | | | | |
| 223 | U | 0 | 4 | 5 | | | | | | | | | |
| 224 | U | 0 | 4 | 6 | | | | | | | | | |
| 225 | U | 0 | 4 | 7 | | | | | | | | | |
| 226 | U | 0 | 4 | 8 | | | | | | | | | |
| 227 | U | 0 | 4 | 9 | | | | | | | | | |
| 228 | U | 0 | 5 | 0 | | | | | | | | | |
| 229 | U | 0 | 5 | 1 | | | | | | | | | |

Photocopy this page before completing if you have more than 26 wastes to list.

| I.D. Number *(enter from page 1)* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| W | A | 7 | 8 | 9 | 0 | 0 | 0 | 8 | 9 | 6 | 7 |

**IV. DESCRIPTION OF DANGEROUS WASTES *(continued)***

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| 230 | U | 0 | 5 | 2 | | | | | | | | | |
| 231 | U | 0 | 5 | 3 | | | | | | | | | |
| 232 | U | 0 | 5 | 5 | | | | | | | | | |
| 233 | U | 0 | 5 | 6 | | | | | | | | | |
| 234 | U | 0 | 5 | 7 | | | | | | | | | |
| 235 | U | 0 | 5 | 8 | | | | | | | | | |
| 236 | U | 0 | 5 | 9 | | | | | | | | | |
| 237 | U | 0 | 6 | 0 | | | | | | | | | |
| 238 | U | 0 | 6 | 1 | | | | | | | | | |
| 239 | U | 0 | 6 | 2 | | | | | | | | | |
| 240 | U | 0 | 6 | 3 | | | | | | | | | |
| 241 | U | 0 | 6 | 4 | | | | | | | | | |
| 242 | U | 0 | 6 | 6 | | | | | | | | | |
| 243 | U | 0 | 6 | 7 | | | | | | | | | |
| 244 | U | 0 | 6 | 8 | | | | | | | | | |
| 245 | U | 0 | 6 | 9 | | | | | | | | | |
| 246 | U | 0 | 7 | 0 | | | | | | | | | |
| 247 | U | 0 | 7 | 1 | | | | | | | | | |
| 248 | U | 0 | 7 | 2 | | | | | | | | | |
| 249 | U | 0 | 7 | 3 | | | | | | | | | |
| 250 | U | 0 | 7 | 4 | | | | | | | | | |
| 251 | U | 0 | 7 | 5 | | | | | | | | | |
| 252 | U | 0 | 7 | 6 | | | | | | | | | |
| 253 | U | 0 | 7 | 7 | | | | | | | | | |
| 254 | U | 0 | 7 | 8 | | | | | | | | | |
| 255 | U | 0 | 7 | 9 | | | | | | | | | |
| 256 | U | 0 | 8 | 0 | | | | | | | | | |
| 257 | U | 0 | 8 | 1 | | | | | | | | | |
| 258 | U | 0 | 8 | 2 | | | | | | | | | |
| 259 | U | 0 | 8 | 3 | | | | | | | | | |
| 260 | U | 0 | 8 | 4 | | | | | | | | | |
| 261 | U | 0 | 8 | 5 | | | | | | | | | |
| 262 | U | 0 | 8 | 6 | | | | | | | | | |
| 263 | U | 0 | 8 | 7 | | | | | | | | | |
| 264 | U | 0 | 8 | 8 | | | | | | | | | |
| 265 | U | 0 | 8 | 9 | | | | | | | | | |
| 266 | U | 0 | 9 | 0 | | | | | | | | | |
| 267 | U | 0 | 9 | 1 | | | | | | | | | |
| 268 | U | 0 | 9 | 2 | | | | | | | | | |
| 269 | U | 0 | 9 | 3 | | | | | | | | | |
| 270 | U | 0 | 9 | 4 | | | | | | | | | |
| 271 | U | 0 | 9 | 5 | | | | | | | | | |
| 272 | U | 0 | 9 | 6 | | | | | | | | | |
| 273 | U | 0 | 9 | 7 | | | | | | | | | |
| 274 | U | 0 | 9 | 8 | | | | | | | | | |
| 275 | U | 0 | 9 | 9 | | | | | | | | | |

Photocopy this page before completing if you have more than 26 wastes to list.

| I.D. Number *(enter from page 1)* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| W | A | 7 | 8 | 9 | 0 | 0 | 0 | 8 | 9 | 6 | 7 |

## IV. DESCRIPTION OF DANGEROUS WASTES *(continued)*

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| 276 | U | 1 | 0 | 1 | | | | | | | | | |
| 277 | U | 1 | 0 | 2 | | | | | | | | | |
| 278 | U | 1 | 0 | 3 | | | | | | | | | |
| 279 | U | 1 | 0 | 5 | | | | | | | | | |
| 280 | U | 1 | 0 | 6 | | | | | | | | | |
| 281 | U | 1 | 0 | 7 | | | | | | | | | |
| 282 | U | 1 | 0 | 8 | | | | | | | | | |
| 283 | U | 1 | 0 | 9 | | | | | | | | | |
| 284 | U | 1 | 1 | 0 | | | | | | | | | |
| 285 | U | 1 | 1 | 1 | | | | | | | | | |
| 286 | U | 1 | 1 | 2 | | | | | | | | | |
| 287 | U | 1 | 1 | 3 | | | | | | | | | |
| 288 | U | 1 | 1 | 4 | | | | | | | | | |
| 289 | U | 1 | 1 | 5 | | | | | | | | | |
| 290 | U | 1 | 1 | 6 | | | | | | | | | |
| 291 | U | 1 | 1 | 7 | | | | | | | | | |
| 292 | U | 1 | 1 | 8 | | | | | | | | | |
| 293 | U | 1 | 1 | 9 | | | | | | | | | |
| 294 | U | 1 | 2 | 0 | | | | | | | | | |
| 295 | U | 1 | 2 | 1 | | | | | | | | | |
| 296 | U | 1 | 2 | 2 | | | | | | | | | |
| 297 | U | 1 | 2 | 3 | | | | | | | | | |
| 298 | U | 1 | 2 | 4 | | | | | | | | | |
| 299 | U | 1 | 2 | 5 | | | | | | | | | |
| 300 | U | 1 | 2 | 6 | | | | | | | | | |
| 301 | U | 1 | 2 | 7 | | | | | | | | | |
| 302 | U | 1 | 2 | 8 | | | | | | | | | |
| 303 | U | 1 | 2 | 9 | | | | | | | | | |
| 304 | U | 1 | 3 | 0 | | | | | | | | | |
| 305 | U | 1 | 3 | 1 | | | | | | | | | |
| 306 | U | 1 | 3 | 2 | | | | | | | | | |
| 307 | U | 1 | 3 | 3 | | | | | | | | | |
| 308 | U | 1 | 3 | 4 | | | | | | | | | |
| 309 | U | 1 | 3 | 5 | | | | | | | | | |
| 310 | U | 1 | 3 | 6 | | | | | | | | | |
| 311 | U | 1 | 3 | 7 | | | | | | | | | |
| 312 | U | 1 | 3 | 8 | | | | | | | | | |
| 313 | U | 1 | 4 | 0 | | | | | | | | | |
| 314 | U | 1 | 4 | 1 | | | | | | | | | |
| 315 | U | 1 | 4 | 2 | | | | | | | | | |
| 316 | U | 1 | 4 | 3 | | | | | | | | | |
| 317 | U | 1 | 4 | 4 | | | | | | | | | |
| 318 | U | 1 | 4 | 5 | | | | | | | | | |
| 319 | U | 1 | 4 | 6 | | | | | | | | | |
| 320 | U | 1 | 4 | 7 | | | | | | | | | |
| 321 | U | 1 | 4 | 8 | | | | | | | | | |

Photocopy this page before completing if you have more than 26 wastes to list.

| I.D. Number *(enter from page 1)* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| W | A | 7 | 8 | 9 | 0 | 0 | 0 | 8 | 9 | 6 | 7 |

## IV. DESCRIPTION OF DANGEROUS WASTES *(continued)*

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| 322 | U | 1 | 4 | 9 | | | | | | | | | |
| 323 | U | 1 | 5 | 0 | | | | | | | | | |
| 324 | U | 1 | 5 | 1 | | | | | | | | | |
| 325 | U | 1 | 5 | 2 | | | | | | | | | |
| 326 | U | 1 | 5 | 3 | | | | | | | | | |
| 327 | U | 1 | 5 | 4 | | | | | | | | | |
| 328 | U | 1 | 5 | 5 | | | | | | | | | |
| 329 | U | 1 | 5 | 6 | | | | | | | | | |
| 330 | U | 1 | 5 | 7 | | | | | | | | | |
| 331 | U | 1 | 5 | 8 | | | | | | | | | |
| 332 | U | 1 | 5 | 9 | | | | | | | | | |
| 333 | U | 1 | 6 | 0 | | | | | | | | | |
| 334 | U | 1 | 6 | 1 | | | | | | | | | |
| 335 | U | 1 | 6 | 2 | | | | | | | | | |
| 336 | U | 1 | 6 | 3 | | | | | | | | | |
| 337 | U | 1 | 6 | 4 | | | | | | | | | |
| 338 | U | 1 | 6 | 5 | | | | | | | | | |
| 339 | U | 1 | 6 | 6 | | | | | | | | | |
| 340 | U | 1 | 6 | 7 | | | | | | | | | |
| 341 | U | 1 | 6 | 8 | | | | | | | | | |
| 342 | U | 1 | 6 | 9 | | | | | | | | | |
| 343 | U | 1 | 7 | 0 | | | | | | | | | |
| 344 | U | 1 | 7 | 1 | | | | | | | | | |
| 345 | U | 1 | 7 | 2 | | | | | | | | | |
| 346 | U | 1 | 7 | 3 | | | | | | | | | |
| 347 | U | 1 | 7 | 4 | | | | | | | | | |
| 348 | U | 1 | 7 | 6 | | | | | | | | | |
| 349 | U | 1 | 7 | 7 | | | | | | | | | |
| 350 | U | 1 | 7 | 8 | | | | | | | | | |
| 351 | U | 1 | 7 | 9 | | | | | | | | | |
| 352 | U | 1 | 8 | 0 | | | | | | | | | |
| 353 | U | 1 | 8 | 1 | | | | | | | | | |
| 354 | U | 1 | 8 | 2 | | | | | | | | | |
| 355 | U | 1 | 8 | 3 | | | | | | | | | |
| 356 | U | 1 | 8 | 4 | | | | | | | | | |
| 357 | U | 1 | 8 | 5 | | | | | | | | | |
| 358 | U | 1 | 8 | 6 | | | | | | | | | |
| 359 | U | 1 | 8 | 7 | | | | | | | | | |
| 360 | U | 1 | 8 | 8 | | | | | | | | | |
| 361 | U | 1 | 8 | 9 | | | | | | | | | |
| 362 | U | 1 | 9 | 0 | | | | | | | | | |
| 363 | U | 1 | 9 | 1 | | | | | | | | | |
| 364 | U | 1 | 9 | 2 | | | | | | | | | |
| 365 | U | 1 | 9 | 3 | | | | | | | | | |
| 366 | U | 1 | 9 | 4 | | | | | | | | | |
| 367 | U | 1 | 9 | 6 | | | | | | | | | |

Photocopy this page before completing if you have more than 26 wastes to list.

| I.D. Number *(enter from page 1)* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| W | A | 7 | 8 | 9 | 0 | 0 | 0 | 8 | 9 | 6 | 7 |

**IV. DESCRIPTION OF DANGEROUS WASTES *(continued)***

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| 368 | U | 1 | 9 | 7 | | | | | | | | | |
| 369 | U | 2 | 0 | 0 | | | | | | | | | |
| 370 | U | 2 | 0 | 1 | | | | | | | | | |
| 371 | U | 2 | 0 | 2 | | | | | | | | | |
| 372 | U | 2 | 0 | 3 | | | | | | | | | |
| 373 | U | 2 | 0 | 4 | | | | | | | | | |
| 374 | U | 2 | 0 | 5 | | | | | | | | | |
| 375 | U | 2 | 0 | 6 | | | | | | | | | |
| 376 | U | 2 | 0 | 7 | | | | | | | | | |
| 377 | U | 2 | 0 | 8 | | | | | | | | | |
| 378 | U | 2 | 0 | 9 | | | | | | | | | |
| 379 | U | 2 | 1 | 0 | | | | | | | | | |
| 380 | U | 2 | 1 | 1 | | | | | | | | | |
| 381 | U | 2 | 1 | 3 | | | | | | | | | |
| 382 | U | 2 | 1 | 4 | | | | | | | | | |
| 383 | U | 2 | 1 | 5 | | | | | | | | | |
| 384 | U | 2 | 1 | 6 | | | | | | | | | |
| 385 | U | 2 | 1 | 7 | | | | | | | | | |
| 386 | U | 2 | 1 | 8 | | | | | | | | | |
| 387 | U | 2 | 1 | 9 | | | | | | | | | |
| 388 | U | 2 | 2 | 0 | | | | | | | | | |
| 389 | U | 2 | 2 | 1 | | | | | | | | | |
| 390 | U | 2 | 2 | 2 | | | | | | | | | |
| 391 | U | 2 | 2 | 3 | | | | | | | | | |
| 392 | U | 2 | 2 | 5 | | | | | | | | | |
| 393 | U | 2 | 2 | 6 | | | | | | | | | |
| 394 | U | 2 | 2 | 7 | | | | | | | | | |
| 395 | U | 2 | 2 | 8 | | | | | | | | | |
| 396 | U | 2 | 3 | 4 | | | | | | | | | |
| 397 | U | 2 | 3 | 5 | | | | | | | | | |
| 398 | U | 2 | 3 | 6 | | | | | | | | | |
| 399 | U | 2 | 3 | 7 | | | | | | | | | |
| 400 | U | 2 | 3 | 8 | | | | | | | | | |
| 401 | U | 2 | 3 | 9 | | | | | | | | | |
| 402 | U | 2 | 4 | 0 | | | | | | | | | |
| 403 | U | 2 | 4 | 3 | | | | | | | | | |
| 404 | U | 2 | 4 | 4 | | | | | | | | | |
| 405 | U | 2 | 4 | 6 | | | | | | | | | |
| 406 | U | 2 | 4 | 7 | | | | | | | | | |
| 407 | U | 2 | 4 | 8 | | | | | | | | | |
| 408 | U | 2 | 4 | 9 | | | | | | | | | |
| 409 | U | 2 | 7 | 1 | | | | | | | | | |
| 410 | U | 2 | 7 | 7 | | | | | | | | | |
| 411 | U | 2 | 7 | 8 | | | | | | | | | |
| 412 | U | 2 | 7 | 9 | | | | | | | | | |
| 413 | U | 2 | 8 | 0 | | | | | | | | | |

Photocopy this page before completing if you have more than 26 wastes to list.

| I.D. Number *(enter from page 1)* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| W | A | 7 | 8 | 9 | 0 | 0 | 0 | 8 | 9 | 6 | 7 |

## IV. DESCRIPTION OF DANGEROUS WASTES *(continued)*

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| 414 | U | 3 | 2 | 8 | | | | | | | | | |
| 415 | U | 3 | 5 | 3 | | | | | | | | | |
| 416 | U | 3 | 5 | 9 | | | | | | | | | |
| 417 | U | 3 | 6 | 4 | | | | | | | | | |
| 418 | U | 3 | 6 | 5 | | | | | | | | | |
| 419 | U | 3 | 6 | 6 | | | | | | | | | |
| 420 | U | 3 | 6 | 7 | | | | | | | | | |
| 421 | U | 3 | 7 | 2 | | | | | | | | | |
| 422 | U | 3 | 7 | 3 | | | | | | | | | |
| 423 | U | 3 | 7 | 5 | | | | | | | | | |
| 424 | U | 3 | 7 | 6 | | | | | | | | | |
| 425 | U | 3 | 7 | 7 | | | | | | | | | |
| 426 | U | 3 | 7 | 8 | | | | | | | | | |
| 427 | U | 3 | 7 | 9 | | | | | | | | | |
| 428 | U | 3 | 8 | 1 | | | | | | | | | |
| 429 | U | 3 | 8 | 2 | | | | | | | | | |
| 430 | U | 3 | 8 | 3 | | | | | | | | | |
| 431 | U | 3 | 8 | 4 | | | | | | | | | |
| 432 | U | 3 | 8 | 5 | | | | | | | | | |
| 433 | U | 3 | 8 | 6 | | | | | | | | | |
| 434 | U | 3 | 8 | 7 | | | | | | | | | |
| 435 | U | 3 | 8 | 9 | | | | | | | | | |
| 436 | U | 3 | 9 | 0 | | | | | | | | | |
| 437 | U | 3 | 9 | 1 | | | | | | | | | |
| 438 | U | 3 | 9 | 2 | | | | | | | | | |
| 439 | U | 3 | 9 | 3 | | | | | | | | | |
| 440 | U | 3 | 9 | 4 | | | | | | | | | |
| 441 | U | 3 | 9 | 5 | | | | | | | | | |
| 442 | U | 3 | 9 | 6 | | | | | | | | | |
| 443 | U | 4 | 0 | 0 | | | | | | | | | |
| 444 | U | 4 | 0 | 1 | | | | | | | | | |
| 445 | U | 4 | 0 | 2 | | | | | | | | | |
| 446 | U | 4 | 0 | 3 | | | | | | | | | |
| 447 | U | 4 | 0 | 4 | | | | | | | | | |
| 448 | U | 4 | 0 | 7 | | | | | | | | | |
| 449 | U | 4 | 0 | 9 | | | | | | | | | |
| 450 | U | 4 | 1 | 0 | | | | | | | | | |
| 451 | U | 4 | 1 | 1 | | | | | | | | | |
| 452 | W | T | 0 | 1 | | | | | | | | | |
| 453 | W | T | 0 | 2 | | | | | | | | | |
| 454 | W | P | 0 | 1 | | | | | | | | | |
| 455 | W | P | 0 | 2 | | | | | | | | | |
| 456 | W | P | 0 | 3 | | | | | | | | | |
| 457 | W | S | C | 2 | | | | | | | | | Included with above |

Photocopy this page before completing if you have more than 26 wastes to list.

| I.D. Number *(enter from page 1)* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| W | A | 7 | 8 | 9 | 0 | 0 | 0 | 8 | 9 | 6 | 7 |

## IV. DESCRIPTION OF DANGEROUS WASTES *(continued)*

| Line No. | A. Dangerous Waste No. *(enter code)* | | | | B. Estimated Annual Quantity of Waste | C. Unit of Measure *(enter code)* | | | D. Processes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 1. Process Codes *(enter)* | | | | 2. Process Description *(if a code is not entered in D(1))* |
| 458 | D | 0 | 0 | 1 | 80,000 | K | | | S02 | T01 | | | Storage-Tank/Treatment-Tank |
| 459 | D | 0 | 0 | 2 | | | | | | | | | |
| 460 | D | 0 | 0 | 3 | | | | | | | | | |
| 461 | D | 0 | 0 | 4 | | | | | | | | | |
| 462 | D | 0 | 0 | 5 | | | | | | | | | |
| 463 | D | 0 | 0 | 6 | | | | | | | | | |
| 464 | D | 0 | 0 | 7 | | | | | | | | | |
| 465 | D | 0 | 0 | 8 | | | | | | | | | |
| 466 | D | 0 | 0 | 9 | | | | | | | | | |
| 467 | D | 0 | 1 | 0 | | | | | | | | | |
| 468 | D | 0 | 1 | 1 | | | | | | | | | |
| 469 | D | 0 | 1 | 8 | | | | | | | | | |
| 470 | D | 0 | 1 | 9 | | | | | | | | | |
| 471 | D | 0 | 2 | 2 | | | | | | | | | |
| 472 | D | 0 | 2 | 8 | | | | | | | | | |
| 473 | D | 0 | 2 | 9 | | | | | | | | | |
| 474 | D | 0 | 3 | 0 | | | | | | | | | |
| 475 | D | 0 | 3 | 3 | | | | | | | | | |
| 476 | D | 0 | 3 | 4 | | | | | | | | | |
| 477 | D | 0 | 3 | 5 | | | | | | | | | |
| 478 | D | 0 | 3 | 6 | | | | | | | | | |
| 479 | D | 0 | 3 | 8 | | | | | | | | | |
| 480 | D | 0 | 3 | 9 | | | | | | | | | |
| 481 | D | 0 | 4 | 0 | | | | | | | | | |
| 482 | D | 0 | 4 | 1 | | | | | | | | | |
| 483 | D | 0 | 4 | 3 | | | | | | | | | |
| 484 | W | T | 0 | 1 | | | | | | | | | |
| 485 | W | T | 0 | 2 | | | | | | | | | |
| 486 | W | P | 0 | 1 | | | | | | | | | |
| 487 | W | P | 0 | 2 | | | | | | | | | |
| 488 | W | S | C | 2 | | | | | | | | | |
| 489 | F | 0 | 0 | 1 | | | | | | | | | |
| 490 | F | 0 | 0 | 2 | | | | | | | | | |
| 491 | F | 0 | 0 | 3 | | | | | | | | | |
| 492 | F | 0 | 0 | 4 | | | | | | | | | |
| 493 | F | 0 | 0 | 5 | | | | | | | | | |
| 494 | F | 0 | 3 | 9 | | | | | | | | | Included with above |

**IV. DESCRIPTION OF DANGEROUS WASTE (continued)**

**E. Use this space to list additional process codes from Section D(1) on page 3.**

Routine dangerous and/or mixed waste treatment that will be conducted in the 325 HWTUs will include pH adjustment, ion exchange, carbon absorption, oxidation, reduction, waste concentration by evaporation, precipitation, filtration, solvent extraction, solids washing, phase separation, catalytic destruction, and solidification/stabilization. These waste treatments will be conducted on small quantities of diverse radioactive, dangerous and/or mixed wastes generated from ongoing research and development and analytical chemistry activities. Waste to be handled in the 325 HWTUs will include listed waste, waste from non-specific sources, characteristic waste, and state-only criteria waste. Multi-source leachate (F039) is included as a waste derived from non-specific source waste F001 through F005.

**V. FACILIITY DRAWING** Refer to attached drawing(s).

All existing facilities must include in the space provided on page 5 a scale drawing of the facility (see instructions for more detail).

**VI. PHOTOGRAPHS** Refer to attached photograph(s).

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

**VII. FACILITY GEOGRAPHIC LOCATION** This information is provided on the attached drawings and photos.

| LATITUDE *(degrees, minutes, & seconds)* | LONGITUDE *(degrees, minutes, & seconds)* |
|---|---|
| | |

**VIII. FACILITY OWNER**

☒ A. If the facility owner is also the facility operator as listed in Section VII on Form 1, "General Information," place an "X" in the box to the left and skip to Section XI below.

B. If the facility owner is not the facility operator as listed in Section VII on Form 1, complete the following items:

| 1. Name of Facility's Legal Owner | 2. Phone Number *(area code & no.)* |
|---|---|
| | |

| 3. Street or P.O. Box | 4. City or Town | 5. St. | 6. Zip Code |
|---|---|---|---|
| | | | |

**IX. OWNER CERTIFICATION**

*I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

| Name *(print or type)* | Signature | Date Signed |
|---|---|---|
| Lloyd L. Piper, Acting Manager<br>U.S. Department of Energy<br>Richland Operations Office | L.L/ Piper | Revision 4 signed<br>06/30/1997 |

**X. OPERATOR CERTIFICATION**

*I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

| Name *(Print Or Type)* | Signature | Date Signed |
|---|---|---|
| See attachment | | |

## X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

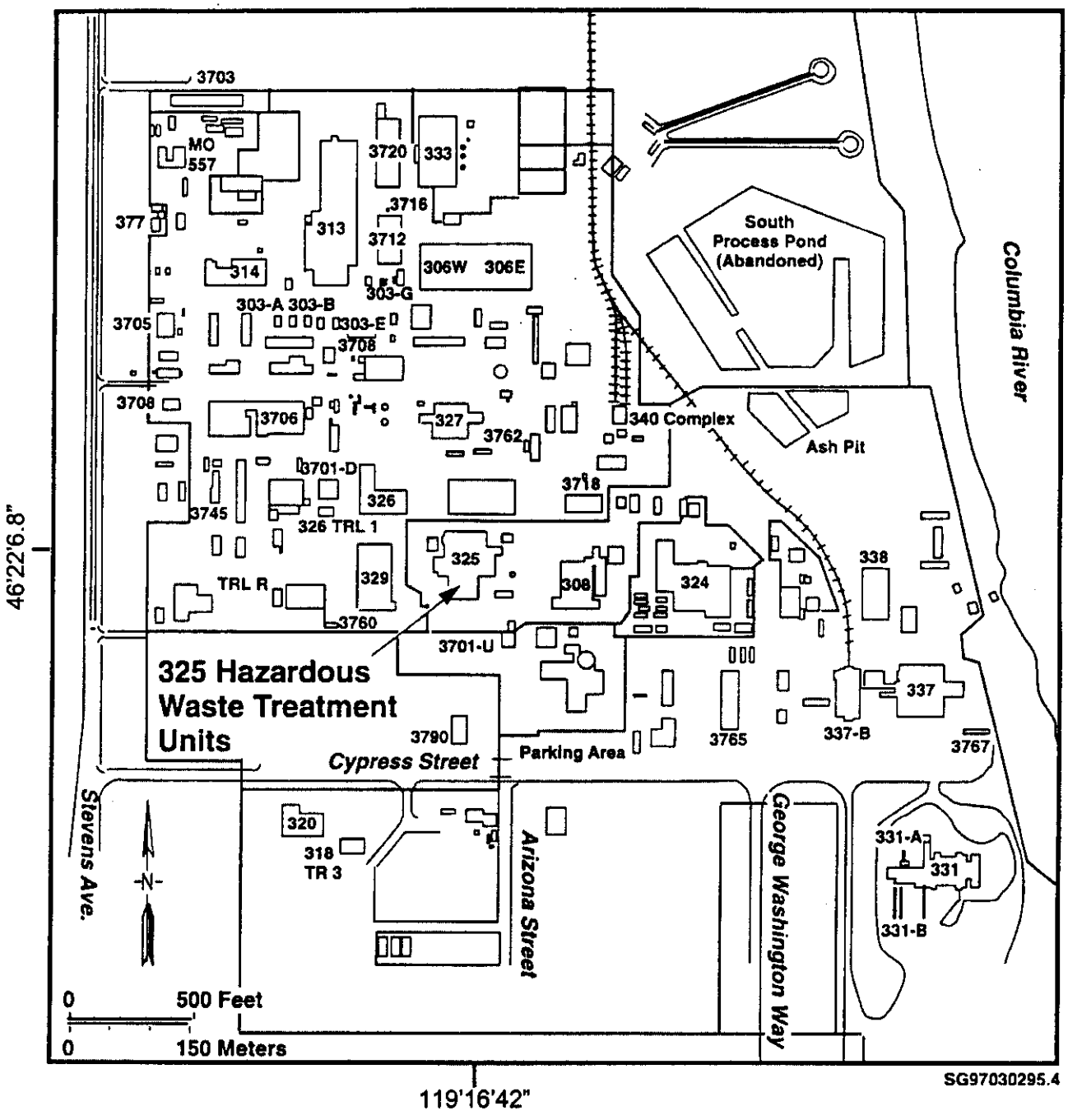
L. L. Piper
Owner/Operator
Lloyd L. Piper, Acting Manager
U.S. Department of Energy
Richland Operations Office

6/30/97
Date Revision 4 Signed

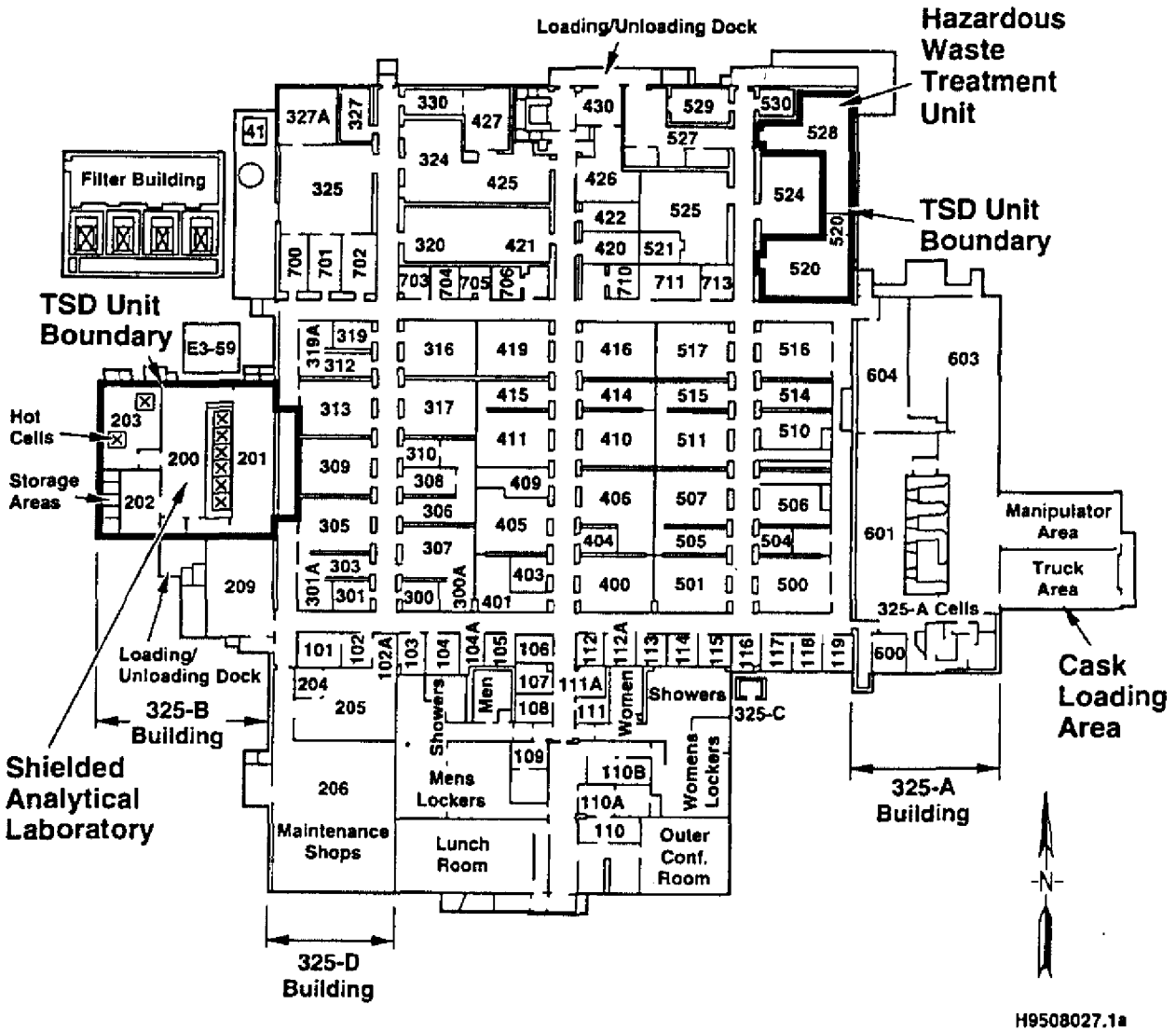
William J. Madia
Co-Operator
William J. Madia, Director
Pacific Northwest national Laboratory

6/26/97
Date Revision 4 Signed

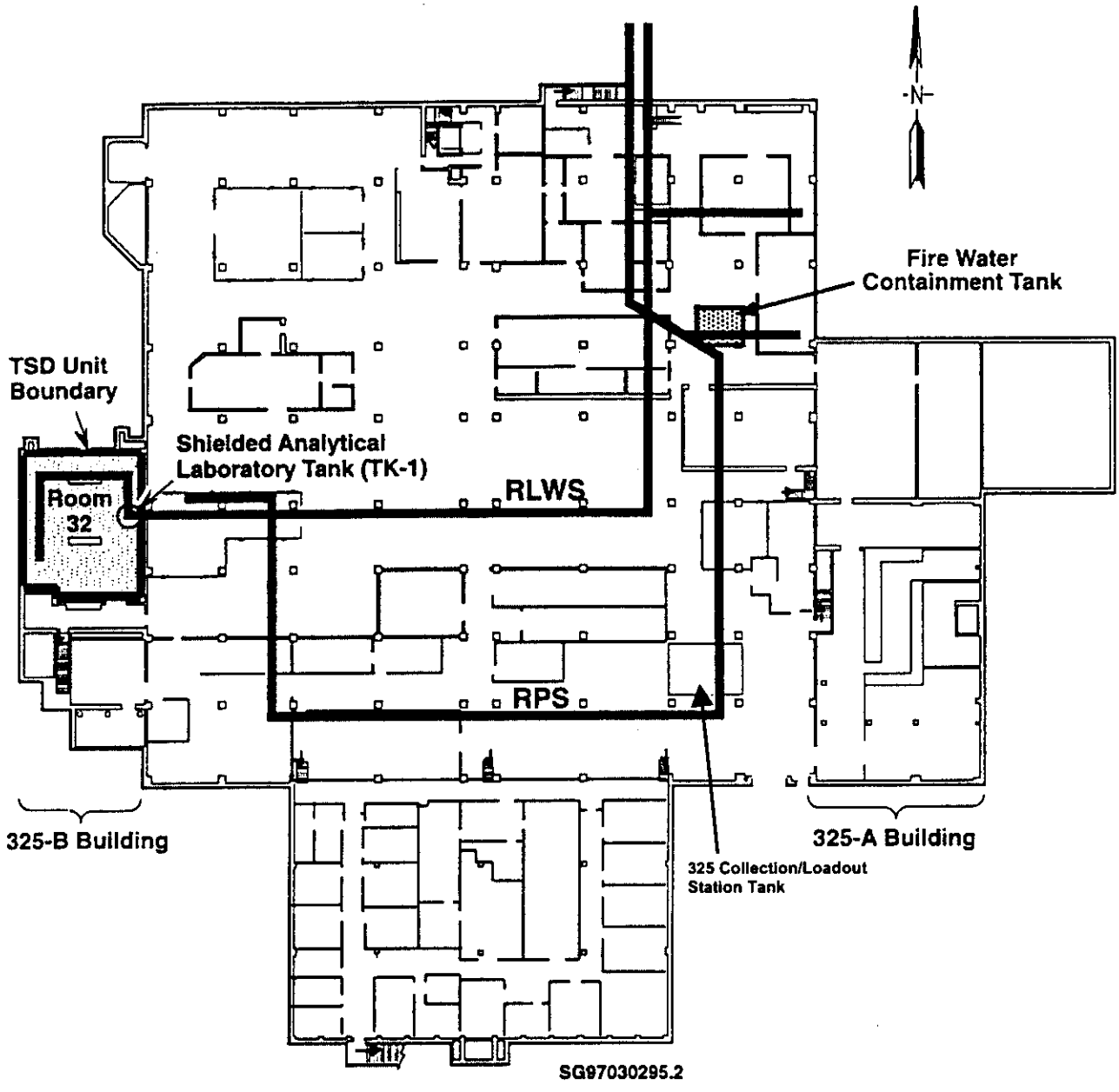
**Location of the 325 Hazardous Waste Treatment Units in the 300 Area.**



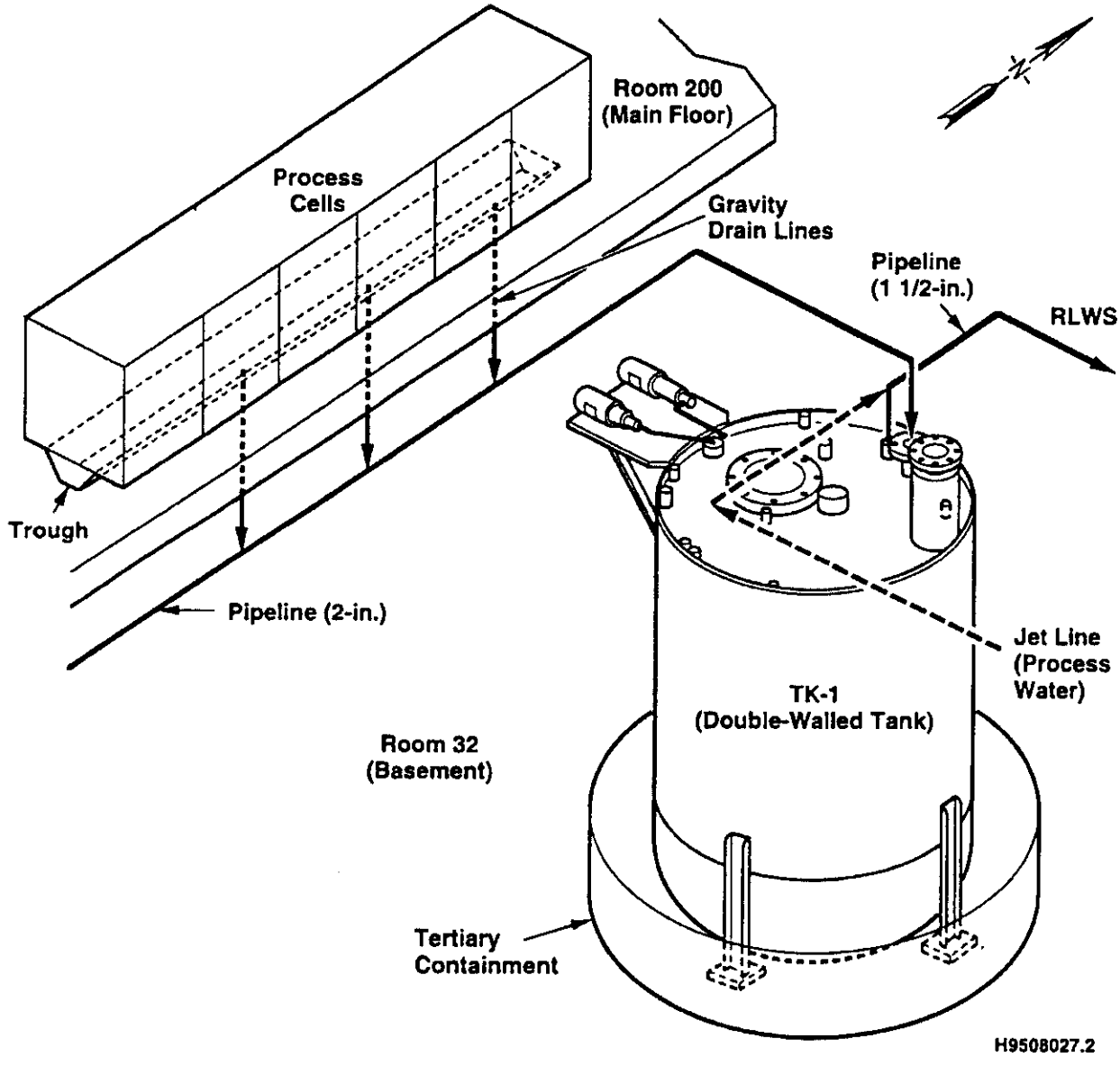
**Location of the Hazardous Waste Treatment Unit and Shielded Analytical Laboratory (main floor).**



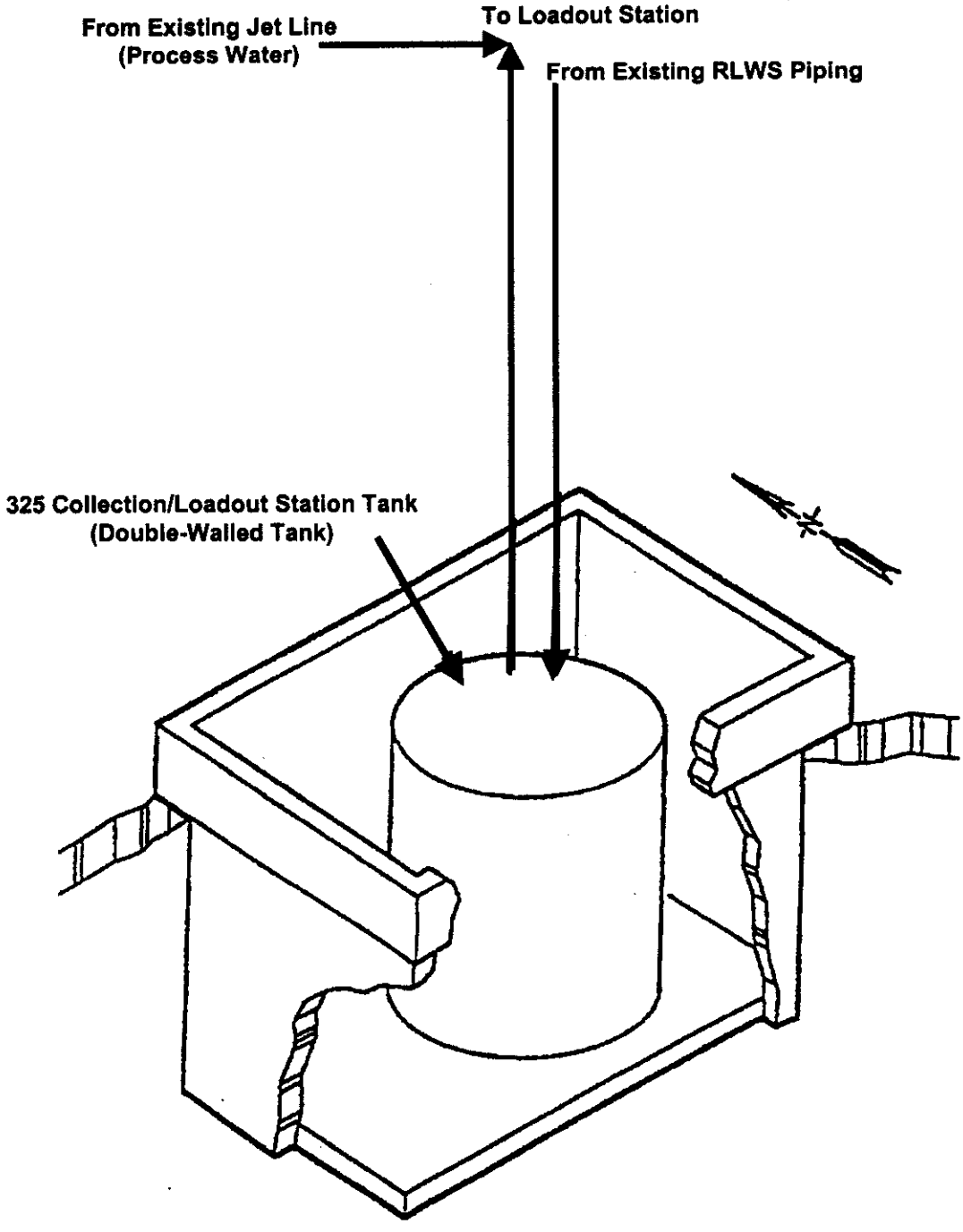
**Location of Shielded Analytical Laboratory Tank in Room 32 and Location of 325 Collection/Loadout Station Tank (basement) of the 325 Building**



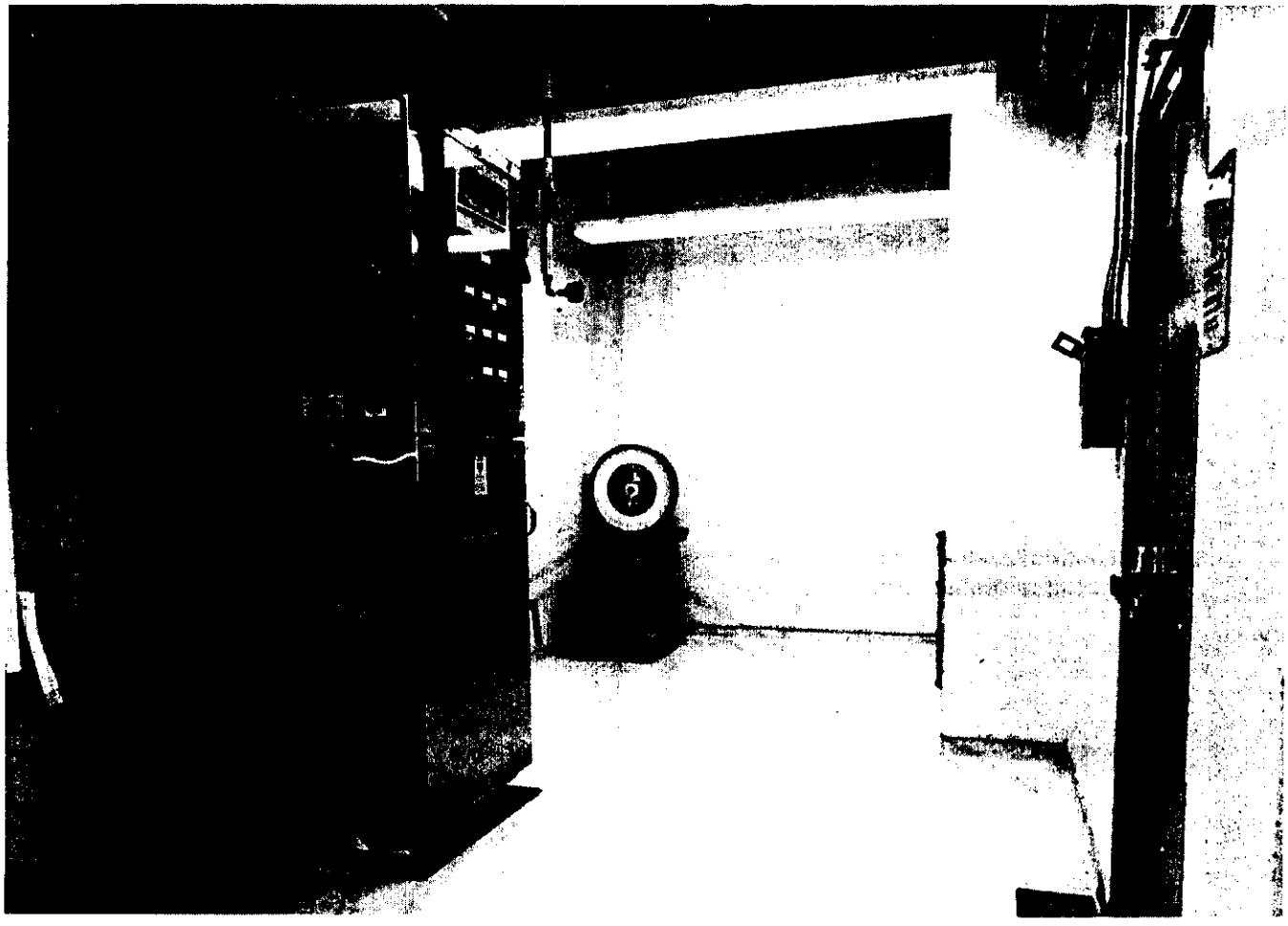
**Shielded Analytical Laboratory Tank and Ancillary Piping.**



**325 Collection/Loadout Station Tank**



# 325 Hazardous Waste Treatment Units

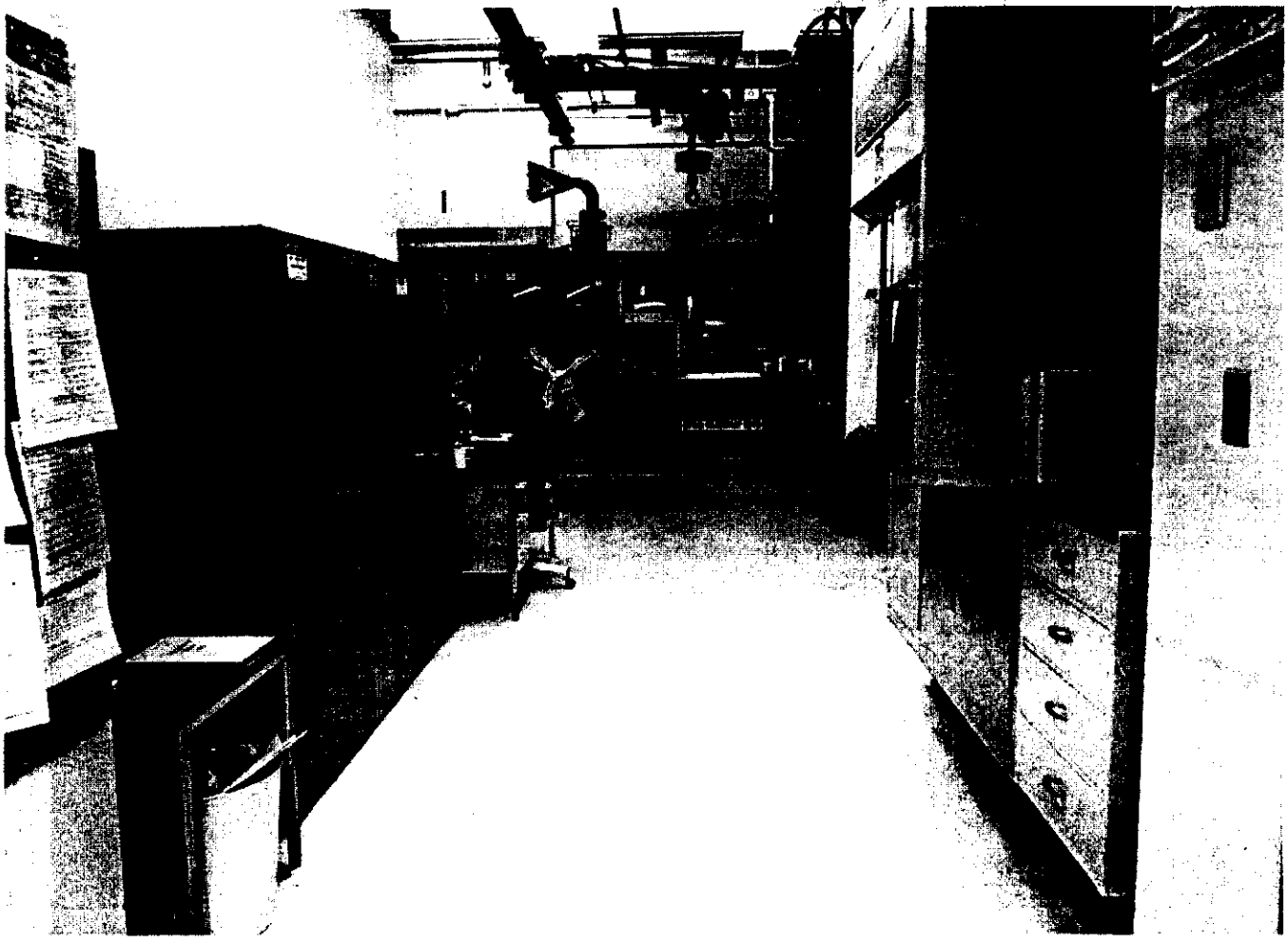


**325 Hazardous Waste Treatment Units**
**Room 528**

**46°22'6.8"**
**119°16'42"**

96010398-22CN
(Photo Taken 1996)

# 325 Hazardous Waste Treatment Units

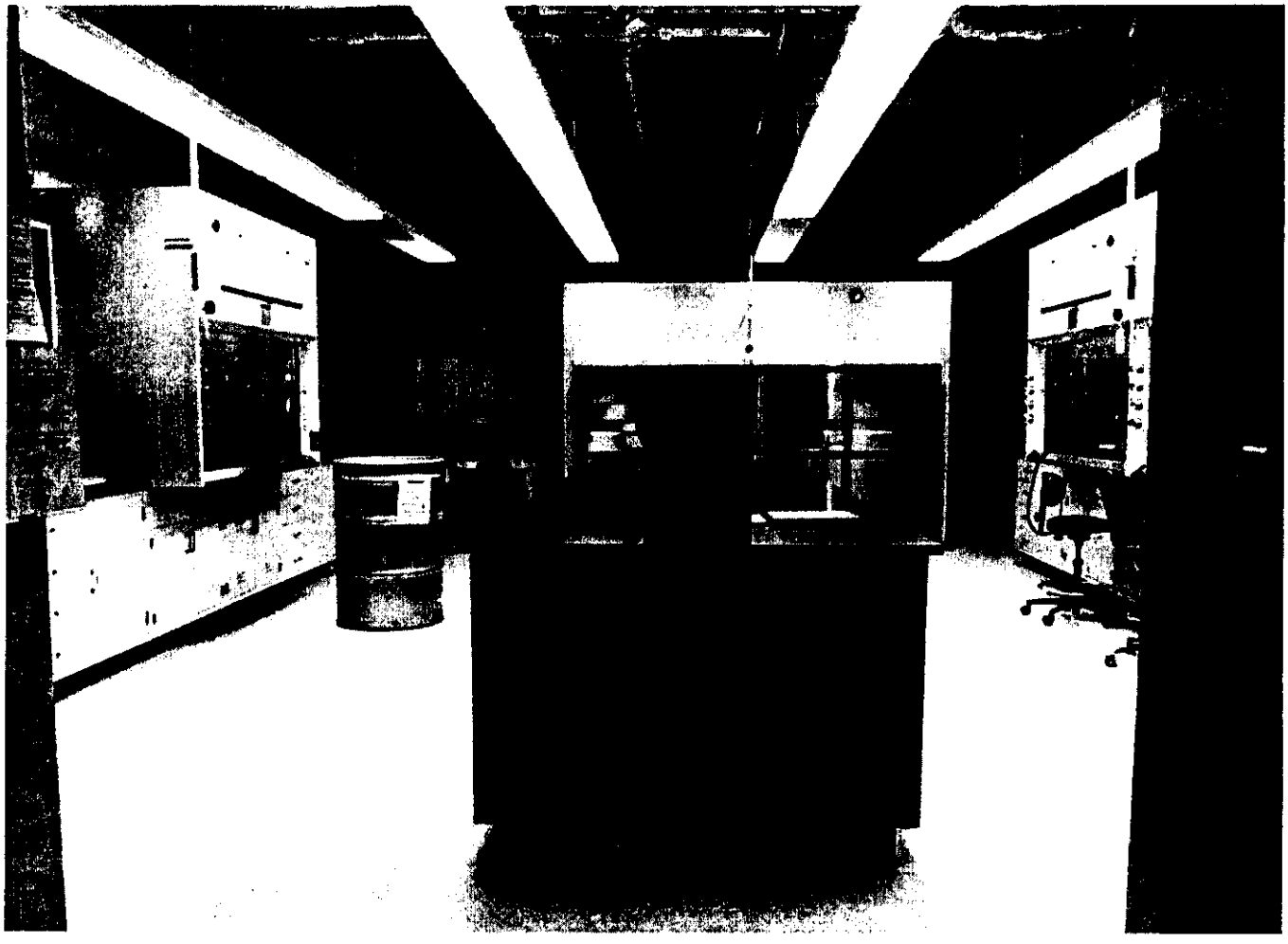


**325 Hazardous Waste Treatment Units**
**Room 528**

**46°22'6.8"**
**119°16'42"**

96010398-20CN
(Photo Taken 1996)

# 325 Hazardous Waste Treatment Units



**325 Hazardous Waste Treatment Units**
**Room 520**

**46°22'6.8"**
**119°16'42"**

96010398-17CN
(Photo Taken 1996)

# 325 Hazardous Waste Treatment Units

**Shielded Analytical Laboratory**
**Room 201**

**46°22'6.8"**
**119°16'42"**

96010398-16CN
(Photo Taken 1996)

# 325 Hazardous Waste Treatment Units

**Shielded Analytical Laboratory**
**Room 201**

**46°22'6.8"**
**119°16'42"**

96010398-7CN
(Photo Taken 1996)

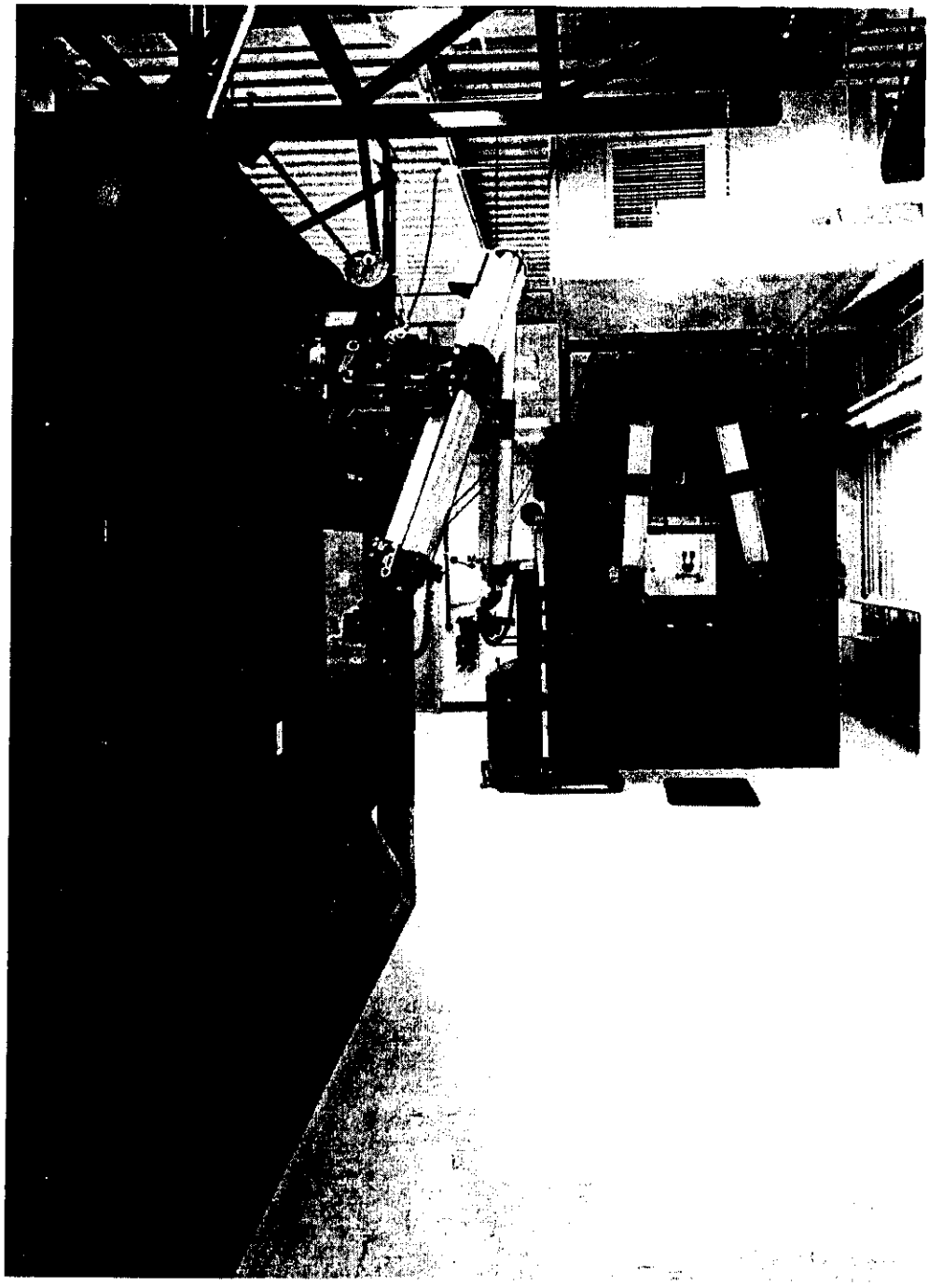
# 325 Hazardous Waste Treatment Units

**Shielded Analytical Laboratory**
**Room 200**

**46°22'6.8"**
**119°16'42"**

**96010398-1CN**
**(Photo Taken 1996)**

# 325 Hazardous Waste Treatment Units

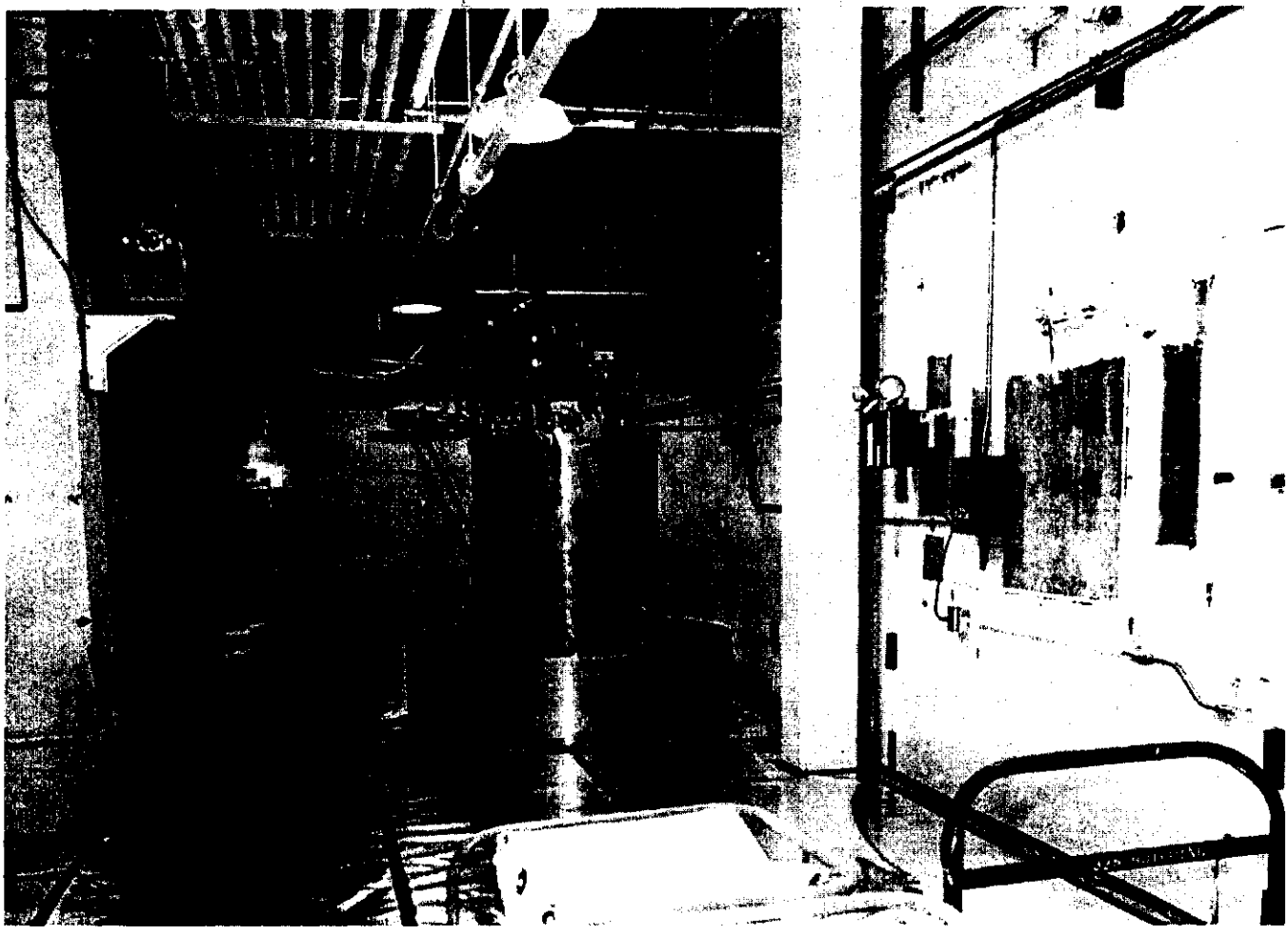


**Shielded Analytical Laboratory**
**Room 203**

**46°22'6.8"**
**119°16'42"**

7908247-1CN
(Photo Taken 1979)

# 325 Hazardous Waste Treatment Units

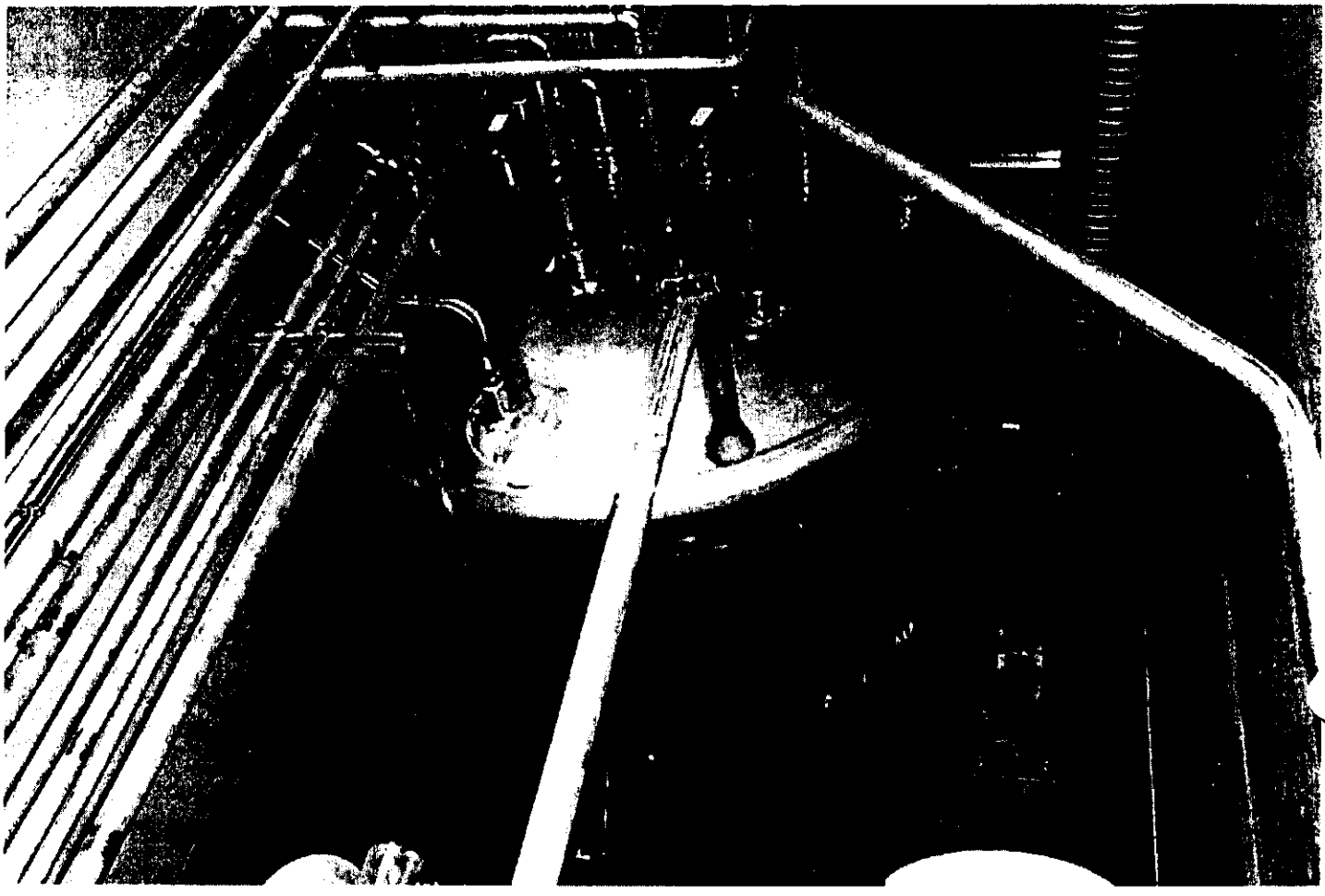


**Shielded Analytical Laboratory**
**SAL Tank**

**46°22'6.8"**
**119°16'42"**

96010398-3CN
(Photo Taken 1996)

# 325 Hazardous Waste Treatment Units



**325 Collection/Loadout Station Tank**

**46°22'6.8"**
**119°16'42"**

(Photo Taken 1999)

# 7.0 CONTENTS



## APPENDIX

# 7.0 CONTINGENCY PLAN

The WAC 173-303 requirements for contingency plans are satisfied in the following documents: the *Building Emergency Plan for the 325 Hazardous Waste Treatment Units*, (Appendix 7A) and the *Hanford Facility Contingency Plan* (DOE/RL-91-28).

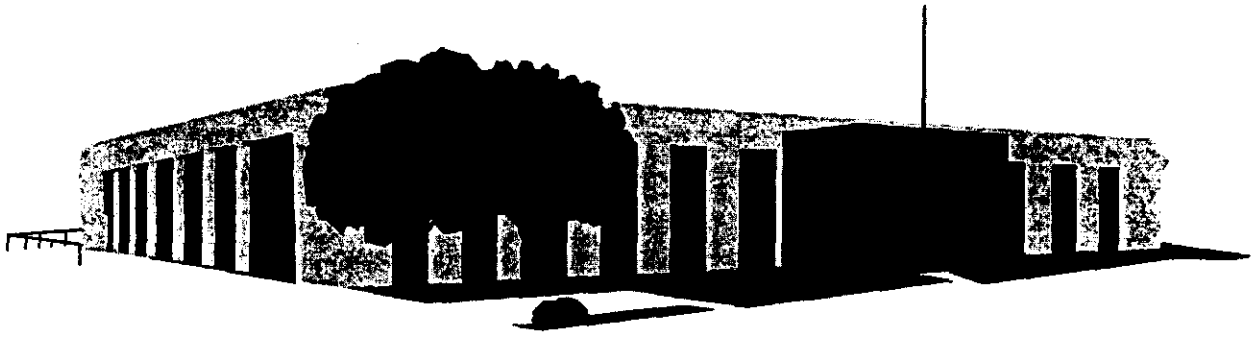
The cited contingency plan documents also serve to satisfy a broad range of other requirements (e.g., Occupational Safety and Health Administration standards and U.S. Department of Energy Orders). Therefore, revisions made to portions of the contingency plan documents that are not governed by the requirements of WAC 173-303 will not be considered as a modification subject to review or approval by Ecology.

# APPENDIX 7A

## Building Emergency Plan for the 325 Hazardous Waste Treatment Units

# Building Emergency Procedure

## Radiochemical Processing Laboratory (RPL) Building



Environmental Management Services — Date: 4/6/00

Building Emergency Director — Date: 4-6-00

Facilities Operations Manager — Date: 4/9/00

March 2001
Scheduled Revision Date

Approved:

Emergency Preparedness Office — Date: 4/6/00

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# Contents

# Tables

# 1.0 General Information

The Radiochemical Processing Laboratory (RPL), (325 Building) Building Emergency Procedure has been designed to provide information necessary to minimize risks to personnel, facilities, programs and the environment in the event of an emergency. This procedure applies to all resident staff, visitors, vendors and contractor/subcontractor personnel.

This facility contains both radioactive and hazardous materials in operations, storage, and handling. The RPL Facility poses a possible significant hazard to adjacent facilities, personnel, programs and the environment.

Emergencies may arise from, but are not limited to the following:

- fire
- explosion
- loss of service systems
- a medical emergency
- bomb threats
- criticality
- criminal activity
- incidents at other facilities
- natural hazards or natural forces
- loss of contamination control
- hazardous materials release.

Expected responses are those actions, which are intended to minimize the effects of a situation while providing optimum protection to personnel. Expected responses include; notification to the PNNL Single-Point-Contact (SPC), Building Manager (BM), Building Emergency Response Organization (BERO) and personnel in the facility. This procedure also provides plans for notifying personnel to take safe actions, such as "Take Cover," "Evacuate" or other planned actions dictated by the event. The procedure provides for formal notification and reporting.

Other emergency response agencies available to assist the Building Emergency Director and Incident Commander from offsite are described in DOE/RL 94-02, Section 3.0.

## 1.1 Facility Name

Radiochemical Processing Laboratory (RPL), 325 Building.

## 1.2 Facility Location

The RPL Facility is in the Southern portion of the 300 Area, East of the 329 Building and West of the 308 Building.

## 1.3 Owner/Operator

The RPL Facility is owned by DOE-RL and operated by PNNL. The primary research organization in the RPL is the Radiochemical Processing Group (RPG) from the Environmental Technology Division (ETD). The manager of the RPG is the senior line manager responsible for all research activities within the facility. Facilities and Operations, through the Building Manager support operation and maintenance of the facility. The Building Manager is the primary Building Emergency Director (BED).

## 1.4 Facility Description

The RPL Building houses laboratories and specialized facilities ranging from work with non-radioactive materials, to work with a microgram to kilogram quantities of fissionable materials and megacurie activities of other radionuclides. Including general-purpose chemical laboratories, high-level radiochemistry facility, shielded analytical laboratory, fissionable material storage areas and 325 Hazardous Waste Treatment Units (HWTUs) (Rooms 32, 46, 200-203, 520 and 528). The general-purpose laboratories characterize fuel, single and double-shell tank waste, environmental samples, fusion/tritium samples, samples from the PUREX and $UO_3$, plants and other wastes. The radiochemistry facility includes areas for glove boxes, hot cells, cask handling, storage and the isolation of isotopes for unique applications like medical use. Analytical laboratory operations are conducted on small amounts of highly radioactive materials such as samples of single-shell tank waste. The Hazardous Waste Treatment Facility treats hazardous, mixed, low-level and transuranic waste.

## 1.5 Hanford Site Emergency Sirens/Alarms

- **Steady Siren** (3-5 minutes) – Area Evacuation – Get car keys if time permits. Go to the staging area (Lower South Parking Lot, North End of Lane #9).

- **Wavering Siren** – Take cover (seek shelter) – Take cover in nearest building, close windows and doors, wait for further instructions.

- **Howler (ah-OO-gah)** – Criticality, Nuclear excursion – Run away from alarm sound. Go directly to the staging area (Lower South Parking Lot, North End of Lane #9). Criticality alarms are tested on a quarterly basis.

- **Gong/Strobe Light** – Fire – Evacuate building via nearest exit. Assemble at the staging area (Lower South Parking Lot, North End of Lane #9).

- **Telephone Bell** – *(intermittent ringing* **RED telephone***)* – *Crash Alarm -Answer crash alarm phone.* Follow instructions given on telephone. Report instructions to the **Building Emergency Director.**

## 1.6 Building Specific Emergency Alarms

The following Local Alarms are located within Radiological Control Areas of the RPL Building. Facility staff that have unescorted access to Radiological Control Areas shall be cognizant of the response to these alarms. *Staff/Vendors who are under escort shall follow the directions of their escort.*

### 1.6.1 Area Radiation Monitor (ARM) Alarm

- exit the Radiological Control Area that is being monitored by the ARM

- contact an RCT

- contact the PNNL Single-Point-Contact (SPC) 375-2400.

### 1.6.2 Continuous Air Monitor (CAM) Alarm

- exit the Radiological Control Area that is being monitored by the CAM

- contact an RCT

- contact the PNNL Single-Point-Contact (SPC) 375-2400.

### 1.6.3 Local Audible Differential Pressure Alarms

Local Audible Alarms are installed on the A-annex hot cells, B-annex hot cells, mini hot cell/shielded glove box in room 23, and glove boxes in rooms 201, 406, 411/415, 414, 506, 517, 525 and 528. Loss of negative pressure will activate the Local Audible Alarm to alert staff of the situation.

**NOTE: IF** a local audible alarm actuates as a result of a transient condition associated with known work conditions, **THEN** it is acceptable to wait 10 seconds for the alarm to reset before taking emergency actions. **IF** the alarm last longer than 10 seconds or the direct cause is unknown, **THEN** immediately perform the emergency actions below.

- evacuate the Immediate Area
- notify an RCT, Building Manager, and the PNNL Single-Point-Contact (SPC) 375-2400.

# 2.0 Building Emergency Procedure

## 2.1 Purpose of the Procedure

The purpose of the RPL Building Emergency Procedure is to provide staff and visitors information necessary to react to emergencies in order to:

- Maximize safety, minimize risk to life and provide prompt efficient treatment for injured staff
- Ensure continuity of leadership in emergencies and all situations
- Reduce the effects on the health and safety of PNNL staff, property, Environment, programs and the public
- Ensure prompt internal and external notifications be made to the Responsible authority
- Ensure the BEP complies with the contingency plan requirements
- Meet the requirements of DOE Order 151.1 series and 232.1A
- Meet the requirements of SBMS Subject Area: "Emergency Preparedness."

## 2.2 Procedure Reviews and Updates

The RPL Building Emergency Director is required to review and update the RPL Building Emergency Procedure annually.

The BEP will be reviewed and amended as necessary if any of the following occur:

- Applicable regulations or the HWTU's permit is revised
- The plan fails in an emergency
- The facility changes in a manner that materially increases or decreases the potential for fires, explosions, or lease of hazardous waste constituents, or in a way that changes the response necessary in an emergency
- The list of emergency coordinators changes
- The list of emergency equipment changes.

## 2.3 Making Changes to the BEP

Section 8.1.3 of PNNL-MA-110 requires the BED to keep the Emergency Preparedness Office (EPO) advised of all changes in the Building Emergency Response Organization. This may be accomplished by memo to the EPO. The Hazardous Waste Treatment Unit (HWTU) Permit Coordinator and RCRA Subject Matter Expert are also required to be notified before any changes are made to the BEP.

## 2.4 Distribution

Revision controlled copies of the BEP will be distributed to the Hanford Fire Department, Hanford Patrol, the PNNL Emergency Preparedness Office, and the HWTU Permit Coordinator. The BEP will be offered to the Richland Fire Department, Benton County Sheriff and the Kadlec Hospital.

# 3.0 Building Emergency Response Organization

The RPL Building Emergency Response Organization (BERO) is an emergency response organization with clearly defined responsibilities. The BERO consists of pre-designated and trained individuals who have been assigned emergency response activities associated with RPL. In addition, other positions in RPL have responsibilities associated with emergency responses and preparedness.

## 3.1 Line Management

The responsibilities of Line Management include the following:

- Keep the BED informed of changes in programmatic activities that could affect an emergency event
- Provide or insure training for your staff as specified in PNNL-MA-110, Section 8.4.1
- Provide training for unescorted visitors for whom you are responsible, as specified in PNNL-MA-110, Section 8.4.7
- Keep the BED and Zone Wardens informed of any staff member assigned to RPL who has a physical disability
- Being familiar with the SBMS subject area " First Aid and Medical Assistance."

Line management has the responsibility to ensure that each PNNL staff member annually reviews this procedure and documents the review with their Training Coordinator.

## 3.2 New Staff Assigned to RPL

All new assignees to the RPL Facility shall complete initial training within 10 working days of assignment. All temporary personnel with unescorted access are required to receive training before beginning work in the RPL Facility.

## 3.3 Individual Staff Members

Announce and activate the appropriate alarm and notify management upon observing an emergency. Read and understand the Building Emergency Postings and BEP. Become familiar with the BEP homepage and the Emergency Preparedness SBMS Subject Area. Avoid exposure to harmful and life-threatening conditions. Report to the staging area. Provide the BED with any information to assist in evaluating the emergency condition. Remain at the Staging Area and follow the instructions of the BED. Wear your individual Emergency Preparedness Information Card.

## 3.4 Facility Visitors

The safety of building visitors is the responsibility of the facility host, who shall ensure that visitors are provided a safe and orderly evacuation. The facility host will report the visitor status to the Staging Area Supervisor as soon, as is practical after the evacuation.

## 3.5 Supervisors/Managers

Account for all staff members. Report missing or injured members to the Staging Area Supervisor and if requested, assist the Staging Area Supervisor.

## 3.6 Unique Program Laboratory Expertise

The technical knowledge of specific programs/laboratory activities are usually known by the laboratory occupant or program manager. When applicable, Cognizant Space Managers, Alternate Cognizant Space Managers, and Team Leads may be contacted in regards to Emergencies or Off-Normal Events in assigned laboratories. Hazard Awareness Summaries containing this information are posted throughout the facility.

## 3.7 Environmental Management Services Department (Environmental Compliance Representative(s), Radiological Control, Industrial Hygienist, and Field Services Representative)

Provide event-related information as necessary for assessing facility and area conditions. The Radiological Control and Industrial Hygienist complete their related "ICP Hazards Assessor Checklist for Hazardous Facilities," Exhibit 12.6.

The Environmental Compliance and Field Services Representatives conduct activities within specific Hazardous Waste Management Activity Areas and provide support to the BED in case of an emergency. The Environmental Support Contact (376-0499) will provide any necessary notifications to regulatory agencies such as the Washington State Department of Ecology.

## 3.8 Building Emergency Directors and Alternates

### 3.8.1 Building Emergency Director

The Building Emergency Director (BED) manages facility operations and personnel and is responsible for ensuring implementation of appropriate emergency procedures and their follow up 24 hours a day. Activities include:

- Direct configuration control over facility systems and components

- Performs the duties of the Emergency Coordinator (Exhibit 12.2.3) as prescribed under WAC 173-303-360 until an Incident Command Post (ICP) is established
- Activates the BERO and allocates personnel to conduct facility-specific emergency response actions (within the affected facility boundary)
- Categorization and notification of the incident to the site contractor, SPC and/or the ONC
- Establishes the Management Support Group (MSG)
- Provides an initial EAL classification
- Directs implementation of initial preplanned area/site protective actions.
- Performs the necessary steps in the "Building Emergency Director Checklist for Hazardous Facilities," Exhibit 12.4
- Responsible for developing and transmitting event reports
- Sounds appropriate alarms
- Acts as a member of the ICP
- Arranges care for any injured persons
- Notifies the HWTU permit personnel of any planned changes to the BEP
- Ensures hazardous spill/release events are logged in the HWTU operating records
- Performs an annual review and update of the BEP
- Informs the Emergency Response Organization of any changes in RPL BERO staff.

## 3.9 Other Members of the Building Emergency Response Organization (BERO)

### 3.9.1 Incident Command Post (ICP) Communicator

The individual responsible for completing and transmitting the RL Notification Form (Exhibit 12.12) to the ONC, phoning the POC at 911 to conduct a line by line review of the RL Notification Form. Initiates and maintains a communication line between the Event Scene Liaison at the RL-EOC and the

Incident Command Post (ICP). As a precautionary measure, the BED ensures that this position is staffed for all events. Assures that the "ICP Communicator Checklist for Hazardous Facilities" is completed, Exhibit 12.5.

### 3.9.2 Assisting Communicator

Initiates and maintains a communication line with the Technical Support Representative in the RL-EOC and the ICP throughout the incident. He/she ensures that the IC and BED are aware of all transmitted and received information. Also, performs as directed by the ICP Communicator.

### 3.9.3 Incident Command Post (ICP) Recorder

Records, in a time-line format, event related notifications and activities associated with the direction administered and information received by the ICP.

### 3.9.4 Management Support Group (MSG) Lead

Determines and uses experienced staff to assist the BED in responding to an emergency related event.

### 3.9.5 Management Support Group (MSG) Recorder

Records, in a time-line format, event related notifications and activities associated with the direction administered and information received by the MSG.

### 3.9.6 Staging Area Supervisor (SAS)

Assists with personnel accountability by receiving the status of facility occupancy from the Zone Wardens then informing the BED of facility status regarding personnel. Notifies the BED if all personnel are accounted for, or if help is needed to locate or account for missing persons. Aids in area evacuation and assists with communications. During events requiring facility evacuation, ensures accountability of visitors by obtaining the PNAD sign-out sheet at the facility receptionist desk. Completes the SAS checklist, Exhibit 12.7.

### 3.9.7 Zone Wardens

Ensure that all staff have left their assigned zone and determine if aid and/or rescue is required. Aid those who need help in evacuating the building. Report the occupancy status of assigned zone to the Staging Area Supervisor and note areas that could not be checked. Assist the BED in communicating emergency messages to the building occupants. Complete the Zone Warden checklist, Exhibit 12.8.

### 3.9.8 Facility Operations Specialist (FOS)

This individual, either the BED or his/her designee, is responsible to ensure that immediate mitigative actions that cannot be delayed without threatening human health and/or the environment, are taken at the event scene. The Facility Operations Specialist (FOS) is responsible for meeting emergency responders at the event scene and providing information on event status and initial actions that are underway. This position will serve under the direction of the Hanford Fire Department/City of Richland Fire Department or Hanford Patrol Operations/Local Law Enforcement Chiefs, upon their arrival, and will provide facility expertise to support Operations Section activities. The FOS is responsible for implementing the Facility Operations Specialist check listed duties, Exhibit 12.11, and maintains a log of activities, conversations, and directives given and received.

# 4.0 Implementation of the BEP

This procedure shall be viewed from the RPL Homepage at http://w3.pnl.gov/facops2/325/info/rplfac.htm.

Consideration of implementation of the contingency plan should be made whenever unusual or emergency conditions exist that require the response of facility and/or emergency personnel and the establishment of an incident command post. Based on evaluation of the event, the BED or alternate will implement the BEP to the extent necessary to protect human health and/or the environment. The BED will complete the following checklists as they may apply to the event:

- Emergency Coordinator Duties until an Incident Command Post (ICP) is established
- Building Emergency Director Checklist for Hazardous Facilities (Exhibit 12.4)
- Delegate completion of RL Emergency Notification Form (Exhibit 12.12)
- Emergency Closeout Checklist (Exhibit 12.13).

Additional checklists identified in the BEP exhibits will be initiated and completed to the extent necessary to protect human health and/or the environment. For example:

- ICP Communicator Checklist for Hazardous Facilities (Exhibit 12.5)
- ICP Hazards Assessor Checklist for Hazardous Facilities (Exhibit 12.6)
- Staging Area Supervisor Checklist (Exhibit 12.7)
- Zone Warden Checklist (Exhibit 12.8)
- Handling of Radiologically Contaminated/Deceased Worker Checklist (Exhibit 12.9)
- Emergency Checklist for Emergency Management Support Group (Exhibit 12.10)
- Facility Operations Specialist (Exhibit 12.11).

# 5.0 Facility Hazards

The RPL contains both radioactive and hazardous chemicals that pose a potential hazard to the public, adjacent facilities, personnel, programs and the environment. Because the location of hazardous materials and equipment within the facility can change on a frequent basis due to specific research needs, a variety of informational tools have been created and integrated into daily operations. These databases are designed to help maintain the safety of all individuals and the environment. Some of the tools available within the facility are the Map Information Tool (MIT), Chemical Management System (CMS), and Hazard Awareness Summaries.

## 5.1 Hazardous Materials

This facility contains hazardous material typically found in an industrial facility including:

- chemical hazards such as corrosives, oxidizers, flammable solids and liquids, poisons, etc.
- radioactive materials
- hazardous wastes
- radioactive mixed wastes.

Refer to the RPL MIT or the Chemical Management System (CMS) to identify the hazardous materials located in a specific room (http://mit/default.htm).

## 5.2 Physical (Industrial) Hazards

The RPL facility may contain industrial hazards such as high-voltage equipment, high temperature equipment, and overhead hazards. Refer to the RPL MIT to identify the physical (industrial) hazards located in a specific room (http://mit/default.htm).

## 5.3 Dangerous Mixed Waste (if any)

See Section 5.1 above. Refer to the RPL MIT to identify the location of any dangerous mixed waste located in a specific room (http://mit/default.htm).

## 5.4 Radioactive Materials (general, if any)

See Section 5.1 above. Refer to the RPL MIT to identify if radioactive materials are located in a specific room (http://mit/default.htm).

## 5.5 Criticality (only address if possible to achieve)

The RPL is a Hazard Category II non-reactor nuclear facility designed as a multi-purpose research facility. Fissionable materials are stored in various locations in the RPL, including the first floor storage room and laboratories.

Storage of fissionable material uses a combination of mass, spacing, geometry, and moderation limits to provide criticality safety. An important criticality control element is through limiting the mass in storage containers so that even if two batches were inadvertently stored together, criticality would not occur.

The RPL Safety Analysis Report (SAR) analyzed various scenarios regarding potential criticality incidents. The nuclear criticality safety program administered within the RPL provides the administrative and physical controls necessary to ensure the possibility of a criticality event remains extremely unlikely. The criticality alarms for the facility are tested on a quarterly basis.

# 6.0 Potential Emergency Conditions and Appropriate Response

## 6.1 Facility Operations Emergencies

For an Off-Normal Event or Emergency Condition not specifically addressed, call the PNNL Single-Point-Contact (SPC) on 375-2400. PNNL staff who observe a facility condition which may include, but not limited to the following: smoke, heat, vibration, or unusual sounds such as hissing should leave the area immediately and make the appropriate emergency notifications. The following guidance is offered for specific listed incidents:

### 6.1.1 Loss of Electrical Power

1. **(Signal): NONE**

2. **Response/Action**

   - Close Fume Hoods Sashes.
   - Shut down all equipment (if time permits).
   - Secure Special Nuclear Material(s).
   - Secure Classified Documents.
   - Secure all Hazardous Materials.
   - Exit Radiological Control Areas in an orderly manner and report to the RPL main floor lunchroom/lobby.

3. **If Standby Power Fails: Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 12.3.4). Zone Wardens report to the Staging Area Supervisor.**

   - If wearing PPE clothing, or you suspect that you may be contaminated, isolate yourself from other building occupants and await survey by Radiological Control Personnel.
   - Zone Wardens and all Staff are to remain at the Staging Area and follow the instructions of the RPL Building Emergency Director.

### 6.1.2 Major Process Disruption/Loss of Building Control

Information applicable to this emergency condition is found in Sections 6.1.1, 6.1.3, 6.1.4.a, and 7.0.

### 6.1.3 Pressure Release (if possible)

Information applicable to this emergency condition is found in Sections 6.1.4.a, 6.1.5, 6.1.9, or 6.1.12.

### 6.1.4 Fire

1. **(Signal): GONG/STROBE LIGHT**

2. **Response/Action if you are notified of a fire and time permits:**

   - Shut down equipment
   - Close doors/windows
   - Secure Nuclear Materials
   - Secure classified documents or carry them with you
   - Evacuate the building through the nearest exit that you can safely use
   - Do not remove PPE clothing prior to exiting the facility, (keep separate from the rest of the staff at the staging area until an RCT has performed the appropriate survey)
   - BED reports to the scene
   - BED obtains all necessary information pertaining to the incident.

3. **Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 12.3.4). Zone Wardens report to the Staging Area Supervisor.**

   - Zone Wardens and all staff are to remain at the staging area unless directed/released by the RPL Building Emergency Director.
   - If wearing PPE clothing, or you suspect that you may be contaminated, separate yourself from other building occupants and await a survey by Radiological Control Personnel.

4. **If you discover a fire, the following steps are to be performed:**

   - Sound the alarm
   - Notify PNNL Single-Point-Contact (SPC) 375-2400

- Fight the fire, (if able to do so *safely*)
- Initiate the same response as listed for the situation in which you are notified of a fire.

#### 6.1.4.1 Explosion

1. **(Signal): None**
2. **Response/Action**
   - Pull Fire Alarm and notify nearby personnel of the emergency.
   - Immediately notify the Single Point-of-Contact by 375-2400 and provide all known information, if the information can be obtained without jeopardizing personnel safety, include the following:
     - Name and callback telephone number of person reporting the incident
     - Name(s) of chemical(s) involved and amount(s) spilled, on fire, or otherwise involved in the incident
     - Location of incident (identify as closely as possible and include information about multiple building numbers)
     - Time incident began or was discovered
     - Where the materials involved are going or might go, such as into secondary containment, under doors, through air ducts, etc.
     - Source and cause, if known, of spill or discharge
     - Name(s) of anyone contaminated or injured in connection with the incident
     - Any corrective actions in progress.
3. **Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 12.3.4). Zone Wardens report to the Staging Area Supervisor.**
   - If wearing PPE clothing, or you suspect that you may be contaminated, isolate yourself from other building occupants and await survey by Radiological Control Personnel.
   - Zone Wardens and all Staff are to remain at the Staging Area and follow the instructions of the RPL Building Emergency Director.

### 6.1.5 Hazardous Material Spill (radioactive, non-radioactive, toxic, or hazardous material)

1. **(Signal): NONE**

2. **Response/Action**

   - Move away from substance.

   - Notify nearby personnel of the emergency.

   - Notify the PNNL Single-Point-Contact (SPC) 375-2400 and provide the following:

     - Name and callback telephone number of person reporting the incident

     - Name(s) of chemical(s) involved and amount(s) spilled, on fire, or otherwise involved in the incident

     - Location of incident (identify as closely as possible and include information about multiple building numbers)

     - Time incident began or was discovered

     - Where the materials involved are going or might go, such as into secondary containment, under doors, through air ducts, etc.

     - Source and cause, if known, of spill or discharge

     - Name(s) of anyone contaminated or injured in connection with the incident

     - Any corrective actions in progress

     - Anyone else who the discoverer has contacted.

     - Prevent personnel exposure (e.g., set up barricades).

   - Notify the Environmental Support Contact (376-0499).

   - Take steps to contain the spill ONLY IF ALL THE FOLLOWING EXIST:

     - The identity of the substance is known

     - Appropriate protective equipment and control/cleanup supplies are readily available

- The discover has received training related to spill/leak control and can safely perform the action(s) without assistance, or assistance is readily available from other trained personnel.

3. **If the spill is outside of a secondary containment type space (e.g., TSD, Hot Cell, etc.):**

   - Pull the nearest fire alarm
   - Notify nearby personnel of the spill
   - Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 12.3.4). Zone Wardens report to the Staging Area Supervisor
   - If wearing PPE clothing, or you suspect that you may be contaminated, isolate yourself from other building occupants and await survey by Radiological Control Personnel
   - Zone Wardens and all Staff are to remain at the Staging Area and follow the instructions of the RPL Building Emergency Director.

   **NOTE**: Clean-up materials are located in specific laboratories.

### 6.1.6 Dangerous/Mixed Waste Spill (address only if possible)

Included in emergency response for Section 6.1.5, "Hazardous Material Spill."

### 6.1.7 Transportation and/or Packaging Incidents

1. **(Signal): NONE**

2. **Response/Action**

   - When a damaged shipment of hazardous material or dangerous waste arrives at the HWTU, the shipment is unacceptable for receipt under the criteria identified in the HWTU permit.
   - Treat any release from the package as a hazardous material spill and perform response actions per Section 6.1.5, "Hazardous Material Spill."
   - Do not move the shipment.
   - Notify the generator of the damaged shipment and obtain any chemical information necessary to assist in the response.

### 6.1.8 Unusual, Irritating, or Strong Odors

1. **(Signal): NONE**

2. **Response/Action**

3. **If potentially dangerous:**

   - Activate Building Fire Alarm

   - Notify the PNNL Single-Point-Contact (SPC) 375-2400

   - Evacuate Building to Staging Area, located at the Lower South Parking Lot, North end of Lane #9 (Exhibit 12.3.4).

4. **If the occupant has knowledge of the source and scope of the release and believes the release poses no danger to staff:**

   - Notify the Building Manager

   - Notify Your Manager

**NOTE:** If an unusual odor is detected and the source is unknown, the RPL Building Emergency Director will determine if the building should be evacuated.

### 6.1.9 Radiological Material Release

1. **(Signal): NONE**

2. **Response/Action**

   - Move away from substance.

   - Notify nearby personnel of the emergency.

   - Notify the PNNL Single-Point-Contact (SPC) 375-2400 and provide the following:

     - Name and callback telephone number of person reporting the incident

     - Name(s) of material(s) involved and amount(s) spilled, on fire, or otherwise involved in the incident

- Location of incident (identify as closely as possible and include information about multiple building numbers)

- Time incident began or was discovered

- Where the materials involved are going or might go, such as into secondary containment, under doors, through air ducts, etc.

- Source and cause, if known, of spill or discharge

- Name(s) of anyone contaminated or injured in connection with the incident

- Any corrective actions in progress

- Anyone else who the discoverer has contacted

- Prevent personnel exposure (e.g., set up barricades).

- Take steps to contain the release ONLY IF ALL THE FOLLOWING EXIST:

  - The identity of the substance is known

  - Appropriate protective equipment and control/cleanup supplies are readily available

  - The discover has received training related to spill/leak control and can safely perform the action(s) without assistance, or assistance is readily available from other trained personnel.

3. **If the release is outside of a secondary containment type space (e.g., TSD, Hot Cell, etc.):**

   - Pull the nearest fire alarm

   - Notify nearby people of the emergency

   - Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 12.3.4). Zone Wardens report to the Staging Area Supervisor.

   - If wearing PPE clothing, or you suspect that you may be contaminated, isolate yourself from other building occupants and await survey by Radiological Control Personnel

   - Zone Wardens and all Staff are to remain at the Staging Area

   - Follow the instructions of the RPL Building Emergency Director.

   **NOTE**: Clean-Up Materials are located in Specific Laboratories.

### 6.1.10 Criticality

Criticality is an event, which is limited to a few specific facilities. This information is provided to all personnel entering a PNNL Nuclear Facility (RPL Building).

1. **(Signal): HOWLER (ah-OO-gah)**

2. **Responses/Action**

   - Leave the Building Immediately.

   - Run away from Alarm Sound/Building.

3. **Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 12.3.4). Zone Wardens report to the Staging Area Supervisor.**

   - If wearing PPE clothing, or you suspect that you may be contaminated, isolate yourself from other building occupants and await survey by Radiological Control Personnel.

   - Zone Wardens and all Staff are to remain at the Staging Area and follow the instructions of the RPL Building Emergency Director.

**NOTE**: Instrumentation and procedures shall be provided for determining the radiation dose levels at the staging area and in the evacuated area following a criticality accident. Information should be correlated at a central control point (Incident Command Post).

### 6.1.11 Reduced Ventilation Flows (due to normal power failure or exhaust fan failure)

1. **(Signal): NONE**

2. **Response/Action**

   - Close Fume Hood Sashes

   - Exit Radiological Control Areas in an orderly manner

   - Stage in the main floor lunchroom/lobby

   - Remain in the lunchroom/lobby area and follow the instructions of the RPL Building Emergency Director.

### 6.1.12 Area Evacuation

1. **(Signal): STEADY SIREN (3 to 5 minutes)**

2. **Response/Action**

   - Follow instructions; evacuate through the nearest safe exit (Exhibits 12.3.1, 12.3.2, 12.3.3, and 12.3.4).

   - Shut down equipment (if time permits).

   - Secure Nuclear Materials(s).

   - Secure classified documents, or carry them with you.

   - Remove PPE clothing prior to exiting the Radiological Control Areas (if possible).

3. **Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 12.3.4). Zone Wardens report to the Staging Area Supervisor.**

   - Zone Wardens and all Staff remain at the Staging Area and follow the instructions of the RPL Building Emergency Director.

## 6.2 Identification of Hazardous Materials in and Around the Facility

The RPL contains both radioactive and hazardous materials that pose a potential hazard to the public, adjacent facilities, personnel, programs and the environment. Within the facility, there are a variety of informational tools integrated into daily operations that are designed to help maintain the safety of all individuals and the environment. Some of the tools available within the facility are:

- Hazard Awareness Summaries – identifies the specific spaces an individual is authorized to access, the training requirements needed to access the space, and whether the requirements have been completed (http://leo.pnl.gov/cgi-bin/eops/eopsha.pl).

- Map Information Tool (MIT) – provides the capability to look up information about a specific room within the RPL to identify all the hazards contained in that location. This tool also identifies evacuation routes, fire zones and emergency equipment locations (http://mit/default.htm).

- RPL Laboratory Handbook – contains reference use information and procedures to do work safely in the RPL (http://leo.pnl.gov/cgi-bin/eops/eops_gen_handbook.pl?RPL).

- Chemical Management System (CMS) – The Laboratory-wide Chemical Management System provides an effective way to track chemicals, ensure that safety and health information for each individual chemical in a given inventory is readily available and up-to-date, and to furnish an overall chemical management system.

## 6.3 Natural Phenomena

Follow directions given by Crash Alarm Telephone or RPL Building Emergency Director.

### 6.3.1 Seismic Event

Follow directions given by Crash Alarm Telephone or RPL Building Emergency Director.

### 6.3.2 Volcanic Eruption /Ashfall

Follow directions given by Crash Alarm Telephone or RPL Building Emergency Director.

### 6.3.3 High Winds/Tornadoes

Follow directions given by Crash Alarm Telephone or RPL Building Emergency Director.

### 6.3.4 Flood

Follow directions given by Crash Alarm Telephone or RPL Building Emergency Director.

### 6.3.5 Range Fire

Follow directions given by Crash Alarm Telephone or RPL Building Emergency Director.

## 6.4 Security Contingencies

### 6.4.1 Bomb Threats or Suspicious Objects (e.g., suspicious objects, threats, sabotage)

1. **(Signal): NONE**

2. **Response/Action**

   - When condition is observed or bomb threat received, notify the PNNL Single-Point-Contact (SPC) 375-2400 or Building emergency Director.

   - If necessary, clear the area of personnel.

   - Do not move any suspicious objects.

- Post warnings if applicable.
- Provide Emergency Responders with Appropriate Information.

3. **If a Telephone Bomb Threat is received record the exact message and attempt to obtain the following information:**
   - When will it go off?
   - Where is it located?
   - What does it look like?
   - What kind is it?
   - Why was it placed?
   - How do you know so much about it?
   - Who put it there?
   - Where are you calling from?
   - What is your name and address?

**NOTE:** After receiving the information notify the PNNL Single-Point-Contact (SPC) 375-2400, give the information obtained from the caller and then notify the BED. If you receive a Written Bomb Threat, Notify the PNNL Single-Point-Contact (SPC) 375-2400 and provide the Written Bomb Threat to PNNL Security Personnel.

### 6.4.2 Hostage Situation/Armed Intruder

1. **(Signal): NONE**
2. **Response/Action**
   - When condition is observed, notify the PNNL Single-Point-Contact (SPC) 375-2400 or Building emergency Director.
   - If necessary, clear the area of personnel.
   - Do not move any suspicious objects.

- Post warnings if applicable.
- Provide Emergency Responders with Appropriate Information.

# 7.0 Facility/Area Take Cover – Shutdown of HVAC

1. **(Signal): WAVERING SIREN, CRASH PHONE MESSAGE**

2. **Response/Action**

   - Stay inside the RPL Building.
   - Exit Radiological Control Areas in an orderly manner and report to the RPL main floor lunchroom/lobby.
   - If outside, take cover inside nearest building.
   - Remain in the lunchroom/lobby and follow the instructions of the RPL Building Emergency Director.

3. **Building Emergency Director (BED) response**

   Secure the facility HVAC system per procedure SOP 325-3, Revision 3, "Heating and Ventilation Emergency Shutdown," if there is a potential for a hazardous plume to be drawn in the building OR if directed to do so by the Patrol Operations Center (POC) via a Crash Phone message.

# 8.0 Utility Disconnects Locations

The location of Utility Disconnects may be necessary under extreme emergency conditions. The RPL Building Emergency Director will determine if utility disconnects need to be disconnected/shut. Locations of the utility disconnects or values are described as follows:

## 8.1 Electrical

The RPL Building Main Electrical Control Center Switchgear is located along the central West Wall in the basement. Extreme caution shall be used in the disconnection of this power.

## 8.2 Potable/Process Water

The Internal Valves are located in the Southwest corner of Room 22 in the basement. The External PIV (black standpipe PIV) is located outside at the Southwest corner of the RPL Building.

## 8.3 Gas Supplies

The Acetylene, Methane, and P-10 Gas Distribution Systems are located at the Northeast end of the North Gas Cylinder Dock. Turn cylinders off as directed by the RPL Building Emergency Director.

## 8.4 Steam

The High Pressure Steam Supply Valves are located above the Power Operator's workstation entry door on the second floor East Equipment Room.

## 8.5 Air

The High Pressure Compressed Air Supply Valve is located at the Northeast wall of the basement near the Air Receiver Tank.

## 8.6 Ventilation

Facility Exhaust and Supply Fan Control Center is located on the second floor East Equipment room. The Emergency Power Transfer Switches for Exhaust Fans 1 and 2 are located at the Northwest outside corner of the Final Filter Building.

## 8.7 Fire Protection Supply Water

Fire Suppression Supply Water Post Indicator Valves (Red PIVs) for Riser 1 through 5 are located outside the RPL Building in the following locations:

- Riser #1 PIV, is located at the Northwest corner of the RPL Building by the boiler annex for the 328 Building.
- Riser #2 PIV, is located at the North area inside the fenced area South of the 328 Building.
- Riser #3 PIV, is located at the Southwest corner of the RPL Building.
- Riser #4 PIV, is located Southeast of the RPL-A annex.
- Riser #5 PIV, is located Southeast of the RPL-A annex.

## 8.8 Dry Pipe OS&Y

The Dry Pipe OS&Y Valve for the Dry Pipe Fire Protection System on the North/Receiving Gas Cylinder Dock is located on the second floor in the East Equipment Room at the Northeast wall. This system is supplied suppression water from Riser #2.

# 10.0 Emergency Equipment (Crash Alarm Phones, Fire Extinguishers, etc.)

Support equipment available to assist in responding to an emergency can be found by referring to DOE/RL 94-02, Section 10.2, and the Hanford Fire Department emergency equipment listing in Appendix C of 94-02.

## 10.1 Portable Emergency Equipment

- Portable Fire Extinguishers are located throughout the facility. The locations are identified on the RPL Building Floor Plans (Appendices 12.3.1, 12.3.2, 12.3.3).

- A Mobile Command Post Vehicle can be obtained via Hanford Fire Department (HFD) main telephone number (373-2230). The HFD Battalion Commander will approve and dispatch vehicle.

## 10.2 Communications Equipment/Warning Systems

- Fire Alarm Pull Boxes are located throughout the facility. The primary locations are at all **Exits of the RPL Facility.** All locations are shown on the RPL Building Floor Plans (Appendices 12.3.1, 12.3.2, 12.3.3).

- The Crash Alarm Phone is located in Room 109, which is in the lobby area of the RPL Building.

## 10.3 Personal Protective Equipment (PPE)

Personnel protective equipment is available in the RPL facility. The RPL Laboratory Manual chapter on Personal Protective Equipment identifies appropriate guidance for use of PPE. This information can be addressed at http://leo.pnl.gov/eops/Practices/RPL/PR_19990921123810.9251.1.pdf.

Kits containing a variety of radiation monitoring instruments, forms, and equipment are available for use in an emergency. PNNL maintains these kits, which contain protective apparel, instruments, and equipment for personnel decontamination and other immediate emergency needs. These supplies and equipment are to fulfill immediate needs only during the initial stages of an emergency.

## 10.4 Spill Control and Containment Supplies

Spill Kits are located throughout the facility and are maintained by the Cognizant Space Managers. Additional Spill Kit materials can be obtained in Room 527.

# 9.0 Termination, Incident Recovery, and Restart

## 9.1 Termination

The Incident Commander in consultation with the RPL Building Emergency Director will recommend termination of the event when conditions indicate that it is safe to do so. Exhibit 12.13, "Emergency Closeout Checklist," should be completed before any recommendation is made to terminate a declared emergency.

## 9.2 Recovery

A Recovery Team, consisting of the Incident Commander, RPL Building Emergency Director, and appropriate representation of all facility interests, will develop and recommend a recovery plan. The recovery plan will be reviewed and approved, meeting the requirements of PNNL-MA-110, Section 9.0, Termination, Re-entry, and Recovery.

**Note: Alternate Staging Area** – In the Event of an Extended Building Evacuation during inclement weather, the 3760 Building may be used for housing staff at the direction of the Building Emergency Director.

### 9.2.1 Emergency Decontamination Facilities

The RPL Facility Personnel Decontamination Room is located in the RPL-A annex. Radiological Control Personnel are the only staff that may perform Personnel Decontamination.

If an evacuation of the RPL Facility occurs and re-entry is not possible to decontaminate affected personnel, Radiological Control Supervision may use the 329 Building Personnel Decontamination Facility or transfer the contaminated staff to the Hanford Site Emergency Decontamination Facility.

### 9.2.2 Emergency Radiological Exposure Guidelines

In extremely rare cases, emergency exposure to radiation may be required to rescue personnel or protect major property. Emergency exposure may be authorized in accordance with the provisions contained in 10 CFR 835. The dose limits for personnel performing these operations are listed in Table 9.1.

The lens of the eye dose limit should be three (3) times the listed values. The shallow dose limit to the skin of the whole body and the extremities is ten (10) times the listed values.

**Table 9.1.** Emergency Dose Limits

| **Dose Limit** (Total Effective Dose Equivalent) | **Activity Performed** | **Conditions** |
|---|---|---|
| 5 rem | All | |
| 10 rem | Protecting major property | Only on a voluntary basis where lower dose limit not practicable |
| 25 rem | Lifesaving or protection of large populations | Only on a voluntary basis where lower dose limit not practicable |
| > 25 rem | Lifesaving or protection of large populations | Only on a voluntary basis to personnel fully aware of the risk involved |

## 9.3 Restart

Restart of the facility following emergencies will be conducted in a manner consistent with the recovery plan. The recovery plan will be reviewed and approved, meeting the requirements of PNNL-MA-110, Section 9.0, Termination, Re-entry, and Recovery.

# 11.0 Evacuation of Persons with a Disability or Visitors

The RPL Building Occupants shall be aware of disabled Resident Staff that may require assistance in evacuating the building. A Specific Evacuation Plan may be required for disabled staff. Alternate housing for staff that are sensitive to excessive hot or cold conditions (temperately disabled) may be required due to Emergency Response Actions. The Zone Warden, as part of assigned responsibilities, will ensure that Disabled Persons receive whatever assistance may be required for a safe and orderly evacuation. **Note: Alternate Staging Area** – In the Event of an Extended Building evacuation during Inclement weather, the 3760 Building may be used for housing staff at the direction of the Building Emergency Director.

Staff who are planning to bring a Disabled Visitor to the RPL Building shall contact the RPL Building Emergency Director to determine if a Specific Evacuation Plan will be required.

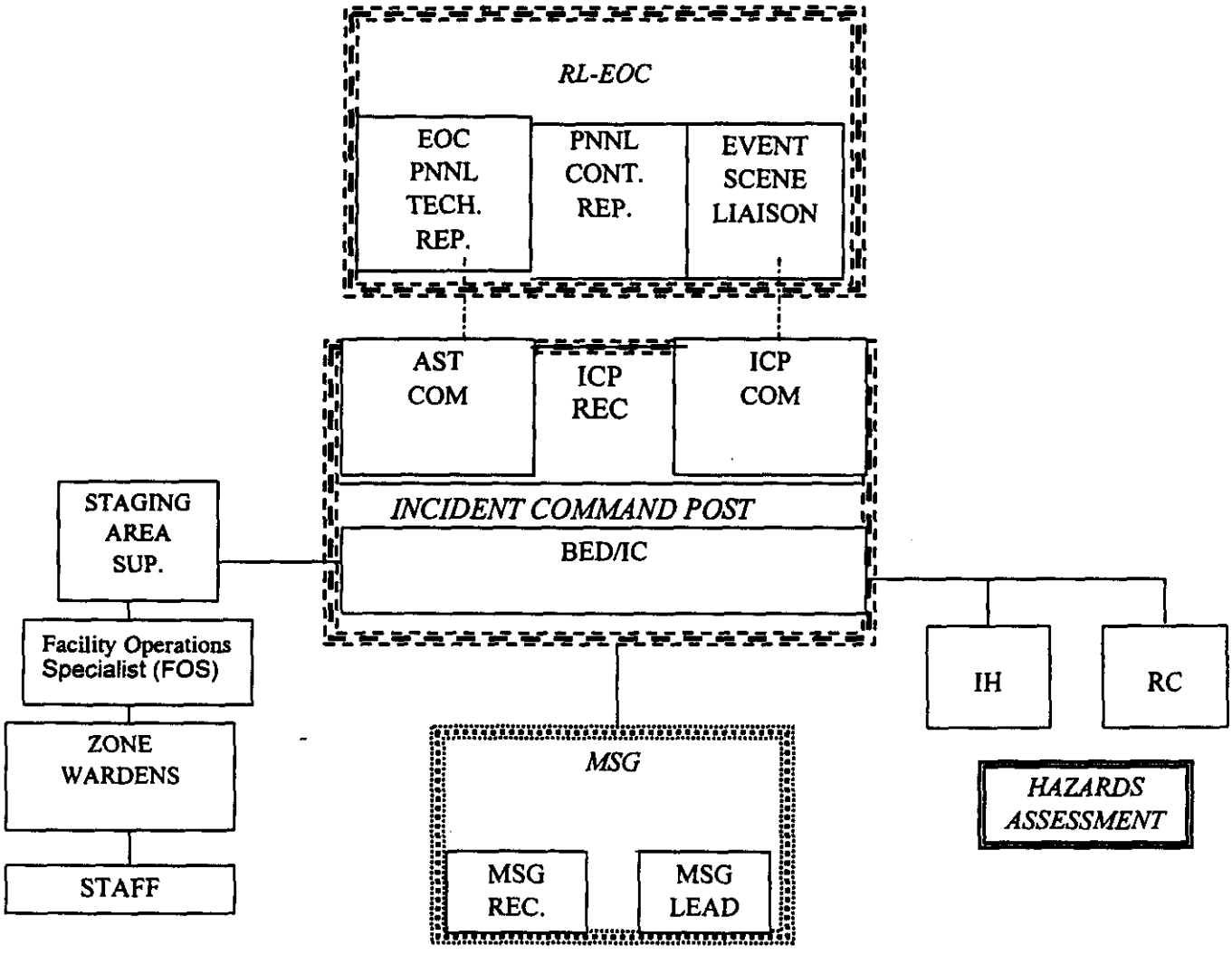
The Safety of RPL Building Visitors is the responsibility of the host, who shall ensure that visitors are provided a safe and orderly evacuation. The host shall report the visitor status to the appropriate Zone Warden as soon as practical, after the evacuation.

# 12.0 Exhibits

## Exhibit 12.1 – Building Emergency Response Organization

**BERO Members**

| BERO Position | Primary Responder | 1st Alternate | 2nd Alternate |
|---|---|---|---|
| BED | Reed Sharp | Frank A Felix | Stanley Jones |
| ICP Communicator | Stanley Jones | N/A | N/A |
| Assisting Communicator | Marie Payne | N/A | N/A |
| ICP Recorder | RPL Building Assistant | N/A | N/A |
| MSG Lead | Juan Alvarez | Glenn Buckley | N/A |
| MSG Recorder | Kelly Ledgerwood | Sherri Ray | N/A |
| Facility Operations Specialist | Jim Sportelli | Ed Arel | Lewis Hogan |
| Staging Area Supervisor | Teresa Schlotman | Karla Smith | Ed Arel |
| Zone Wardens | (See Exhibit 12.2.3) | | |




**Legend**

| | | | |
|---|---|---|---|
| AST | Assisting | IH | Industrial Hygienist |
| BED | Building Emergency Director | MSG | Management Support Group |
| COM | Communicator | RC | Radiation Control |
| CONT | Contractor | REC | Recorder |
| EOC | Emergency Operations Center | REP | Representative |
| IC | Incident Commander | SUP | Supervisor |
| ICP | Incident Command Post | FOS | Facility Operations Specialist |

Communication Link Only _____

**BERO – EOC Interface**

# Exhibit 12.2 – Emergency References

## 12.2.1 Hanford Site Emergency Signals

| EMERGENCY SIGNALS | MEANING | REPSONSE |
|---|---|---|
| **STEADY SIREN** (3-5 minutes) | Area Evacuation | Get car keys if time permits. Go to the staging area **(Lower South Parking Lot, North End of Lane #9).** |
| **WAVERING SIREN** | Take cover (seek shelter) | Take cover in nearest building, close windows and doors, wait for further instructions. |
| **HOWLER (ah-OO-gah)** | Criticality, Nuclear excursion | Run away from alarm sound. Go directly to the staging area **(Lower South Parking Lot, North End of Lane #9).** |
| **GONG/ STROBE LIGHT** | Fire | Evacuate building via nearest exit. Assemble at the staging area **(Lower South Parking Lot, North End of Lane #9).** |
| **TELEPHONE BELL** (intermittent ringing **RED telephone)** | Crash Alarm | Answer crash alarm phone. Follow instructions given on telephone. Report instructions to the **Building Emergency Director.** |

### 12.2.2 Emergency Telephone Numbers

The Building Emergency Director (BED) has the responsibility for the welfare and safety of the building personnel and for directing efforts to control, evaluate, and terminate the event if the building is the site of the event. The BED performs the duties of the Emergency Coordinator as prescribed under WAC 173-303-360 and must have the authority to commit the resources needed to carry out the BEP. Activities include:

- Implement Emergency Response and Follow-up
- Be available 24 hours either on-site or on call
- Coordinate emergency response measures
- Cooperate with Environmental Management Services Department
- Be thoroughly familiar with:
  - RPL (325 Bldg.) Emergency Procedure
  - All operations and activities
  - Location and characteristics of waste handled
  - Location of all records
  - Physical layout of the area

**Building Emergency Director/Emergency Coordinator (BED/EC) and Alternates Emergency Telephone Numbers**

| RPL Building Emergency Director | |
|---|---|
| Reed D. Sharp | 376-5746 |
| Cellular Phone | 727-8269 |
| Pager | 546-6412 |
| Home Phone | 943-6097 |
| Home Address | 635 Birch<br>Richland, WA 99352 |
| **RPL Building, First Alternate BED** | |
| Frank A. Felix | 373-1402 |
| Cellular Phone | 539-2224 |
| Pager | 85-4356 |
| Home Phone | 737-1665 |
| Home Address | 124 S. Arthur<br>Kennewick, WA 99336 |
| **RPL Building, Second Alternate BED** | |
| Stanley L. Jones | 376-7449 |
| Pager | 546-6369 |
| Home Phone | 375-4233 |
| Home Address | 114 Sherman St.<br>Richland, WA 99352 |

| ANY EMERGENCY<br>PNNL SINGLE-POINT-CONTACT<br>375-2400 | |
|---|---|
| **Hanford Fire Department** | **375-2400**<br>**If Inoperable 911** |
| **Hanford Ambulance** | **375-2400**<br>**If Inoperable 911** |
| **Benton County Sheriff** | **375-2400**<br>**If Inoperable 911** |
| **PNNL Duty Officer** | **375-2400** |
| **300 Area ONC** | **376-2900** |
| **Off-Normal Event Reporting** | **375-2400** |

### 12.2.3 Zone Wardens

The Zone Wardens provide information to the Staging Area Supervisor to ensure that no one is unaccounted for, and assists as required in additional duties determined by the BED. The Zone Wardens may be assigned additional duties as needed, to assist in mitigation of an event.

**Duties and Responsibilities**

- Determine if all personnel have left their assigned work areas in the facility, including unoccupied spaces, such as stairwells, corridors, elevators, and closets.

- Perform a thorough room-by-room search (if safe to do so) to provide a high degree of assurance that the facility is free of personnel.

- Report the occupancy/accountability status to the Staging Area Supervisor, and determine if aid or rescue is required.

- Ensure that disabled persons receive whatever assistance may be required for a safe and orderly evacuation.

**Zone Warden Assignments**

| | | |
|---|---|---|
| **Zone 1** | | |
| **Rooms** | 200, 201, 201A, 202, 203, 209, 300, 301, 303, 305, 306, 308, 309, 310, 312, 313, 316, 317, 319, 319A, 320, 324, 325, 330, 327, 327A, 700, 701, 702, 703, and 705 | |
| **Primary** | Rick T. Steele | 372-0038 |
| **Secondary** | F. Vaughn Hoopes | 376-3089 |
| **Zone 2** | | |
| **Rooms** | 400, 401, 403, 404, 405, 406, 409, 410, 411, 414, 415, 416, 419, 420, 421, 425, 426, 427, 430, 500, 501, 504, 504A, 505, 506, 507, 510, 511, 514, 515, 516, 517, 520, 524, 525, 527, 527A, 528, 529, 530, 706, 710 and 711 | |
| **Primary** | Randall D. Scheele | 376-0956 |
| **Secondary** | Joel M. Tingey | 376-2580 |
| **Zone 3** | | |
| **Rooms** | 600, 601, 603, 604, 607, 608, 609, 610 and 611 | |
| **Primary** | Randy E. Thornhill | 376-6769 |
| **Secondary** | Donald E. Rinehart | 376-4337 |
| **Zone 4** | | |
| **Rooms** | 34, 35A, 36,40, 40A, 40B, 40C, 42, 43, 43A, 44, 48 50, 50A, 52, 54, 57, 57E, 57W 58,90, 93, 94, 94A, 94B, 95, 96, 97, 97A, 98, and Basement Common Space adjoining these rooms | |
| **Primary** | Paul J. MacFarlan | 376-5313 |
| **Secondary** | Raymond D. Bell | 376-7302 |

## Zone Warden Assignments (contd)

| Zone 4A | | |
|---|---|---|
| **Rooms** | 22, 22A, 22B, 23, 23A, 23B, 30A, 31, 31A, 32, 33, 55, 56, 60, 61, 62, 63, 64, 91, and Basement Common Space adjoining these rooms | |
| **Primary** | Raymond D. Bell | 376-7302 |
| **Secondary** | Paul J. MacFarlan | 376-5313 |
| **Zone 5** | | |
| **Rooms** | 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 25, 26, 27, 28, 70, 72, 74, 76 and 78 | |
| **Primary** | Sherri E. Ray | 373-9459 |
| **Secondary** | Scott M. Tingey | 372-2961 |
| **Zone 6** | | |
| **Rooms** | 905, 910, 911, 912, 914, 915, 917, 918, 919, 920, 921, 923, 924, 925, 926, 927, 928, 929, 933, 935, 937, 939, 968, and the South & West Equipment Rooms | |
| **Primary** | Larry R. Greenwood | 376-6918 |
| **Secondary** | Edmon L. Daniels | 376-3758 |
| **Zone 7** | | |
| **Rooms** | 930, 932, 936, 938, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 954, 955, 956, 957, 958, 960, 961, 964, 965, 967, and the East Equipment Room | |
| **Primary** | Kelly D. Ledgerwood | 376-4864 |
| **Secondary** | Darrin E. Faulk | 373-7713 |
| **Zone 8** | | |
| **Rooms** | 101, 102, 102A, 103, 104, 104A, 105, 106, 107, 108, 109, 109A, 204, 205, 206, and the Men's Change Room & Lunchroom | |
| **Primary** | Jim M. Sportelli | 376-2654 |
| **Secondary** | Lewis H. Hogan | 372-1427 |

**Zone Warden Assignments (contd)**

| Zone 9 | | |
|---|---|---|
| **Rooms** | 110, 110A, 110B, 110C, 111, 111A, 112, 112A, 113, 114, 115, 116, 117, 118, 119, the Women's Change Room, Main Conference Room | |
| **Primary** | Mac R. Zumhoff | 376-3171 |
| **Secondary** | Ralph C. Lettau | 376-3171 |

### 12.2.4 Staging Area Supervisor and Alternates

The Staging Area Supervisor shall direct all activities at the Staging Area and is responsible for notifying the BED if all personnel are accounted for or if help is needed to locate or account for missing personnel. In the event of an extended building evacuation during inclement weather, the 3760 facility (Old PNNL Library) may be used as an alternate staging area as directed by the BED.

Collect Building Occupancy/Accountability Status from Zone Wardens at Staging Area.

**Staging Area Supervisors**

| | Name | Phone |
|---|---|---|
| **Staging Area Supervisor** | Teresa T. Schlotman | 376-3206 |
| **First Alternate** | Karla J. Smith | 373-6481 |
| **Second Alternate** | Edward S. Arel | 376-9697 |

### 12.2.5 Emergency RPL Facility Contact Phone Numbers

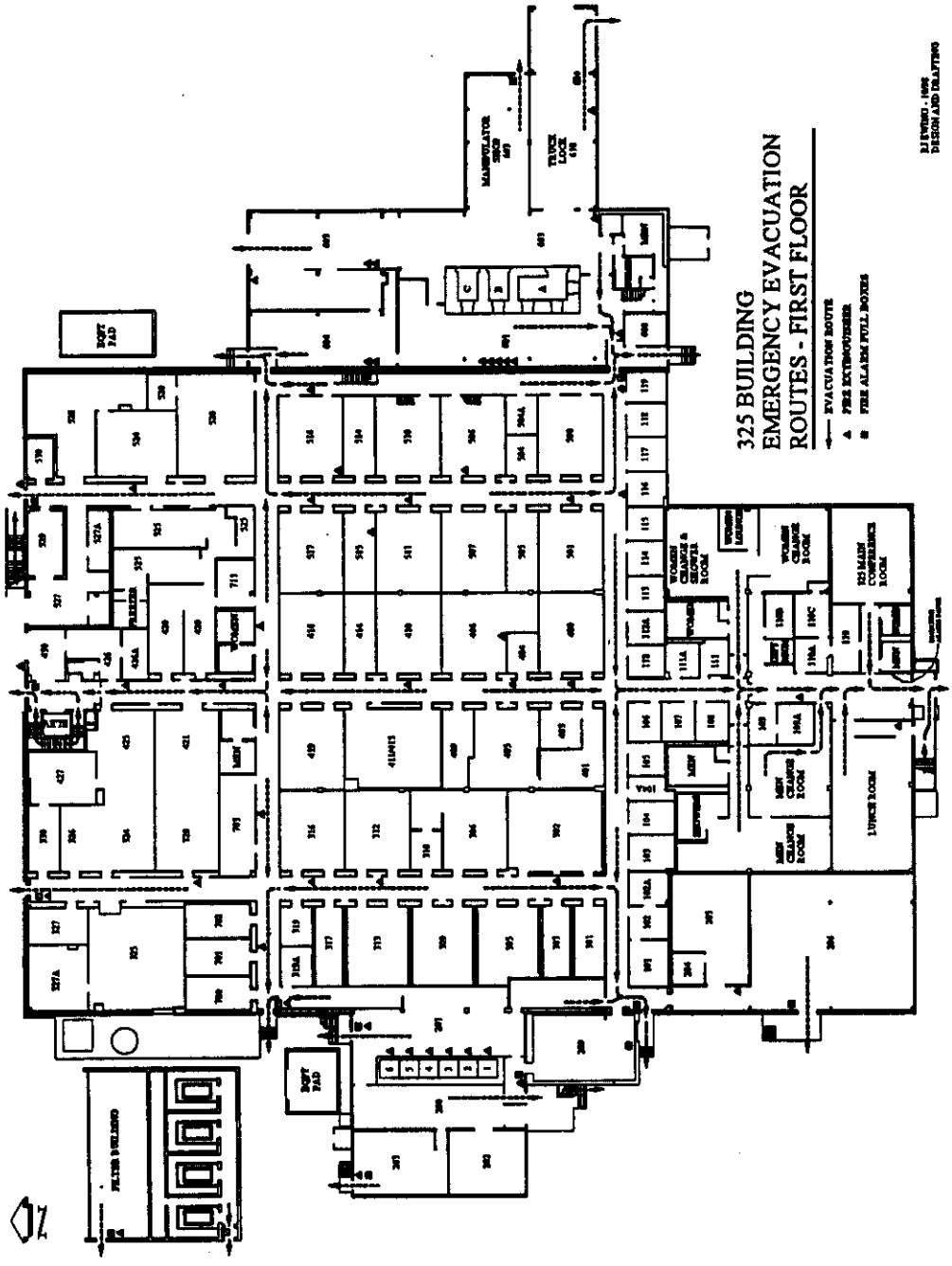
In the event of an Emergency, specific detailed facility information may be needed. Knowledge of the Building, Utilities and Radiation Hazards can be obtained from the staff listed in Table 12.1.

**Table 12.1.** Building, Utilities, and Radiation Hazards Emergency Contacts

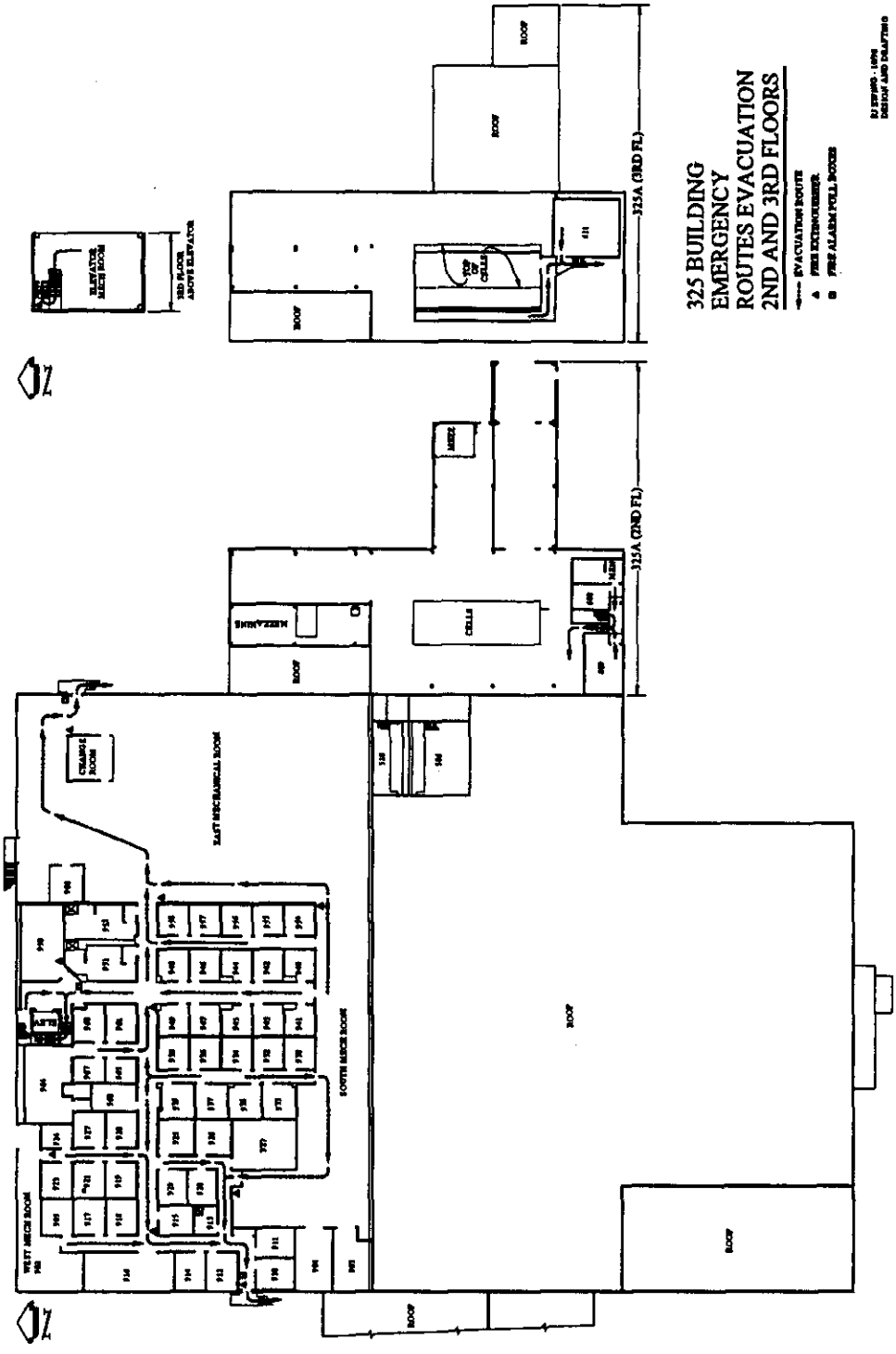
| Title | Name | Work Phone | Cellular & Pager | Home Phone |
|---|---|---|---|---|
| Building Emergency Director (BED)<br>RPL Building Manager | Reed D. Sharp | 376-5746 | 727-8269<br>546-6412 | 943-6097 |
| First Alternate BED | Frank A. Felix | 373-1402 | 539-2224<br>85-4356 | 737-1665 |
| Second Alternate BED | Stanley L. Jones | 376-7449 | 546-6369<br>544-8499 | 375-4233 |
| RPL Building Ventilation & Power Operations Supervisor | Mike J. Moran | 376-5612 | 85-8074 | 628-9104 |
| RPL Building Radiological Control Supervisor | Scott G. Barrett | 376-2575 | 85-3753 | 946-1872 |
| RPL Facilities Project Manager | Jim M. Sportelli | 376-2654 | 727-7243<br>then<br>509-<br>727-8270 | 783-8738 |
| PNNL Single Point of Contact | | 375-2400 | | |
| **Environmental Safety & Health** | | | | |
| Occupational Safety/Fire Protection | Michael W. Fullmer | 376-1886 | 727-8246<br>85-6670 | 967-5583 |
| Industrial Hygiene | Abby L. Nicholson | 376-0345 | 727-8216<br>85-7184 | 967-6620 |
| Waste Management | | | | |
| 90-Day Storage | Raymond D. Bell | 376-7302 | 85-5518 | 943-2924 |
| TSDs | Wayne B. Larson | 376-2483 | 85-6320 | 586-1203 |
| Low-Level Waste | Rene L. Catlow | 376-4804 | | |

# Exhibit 12.3 – Evacuation Routes

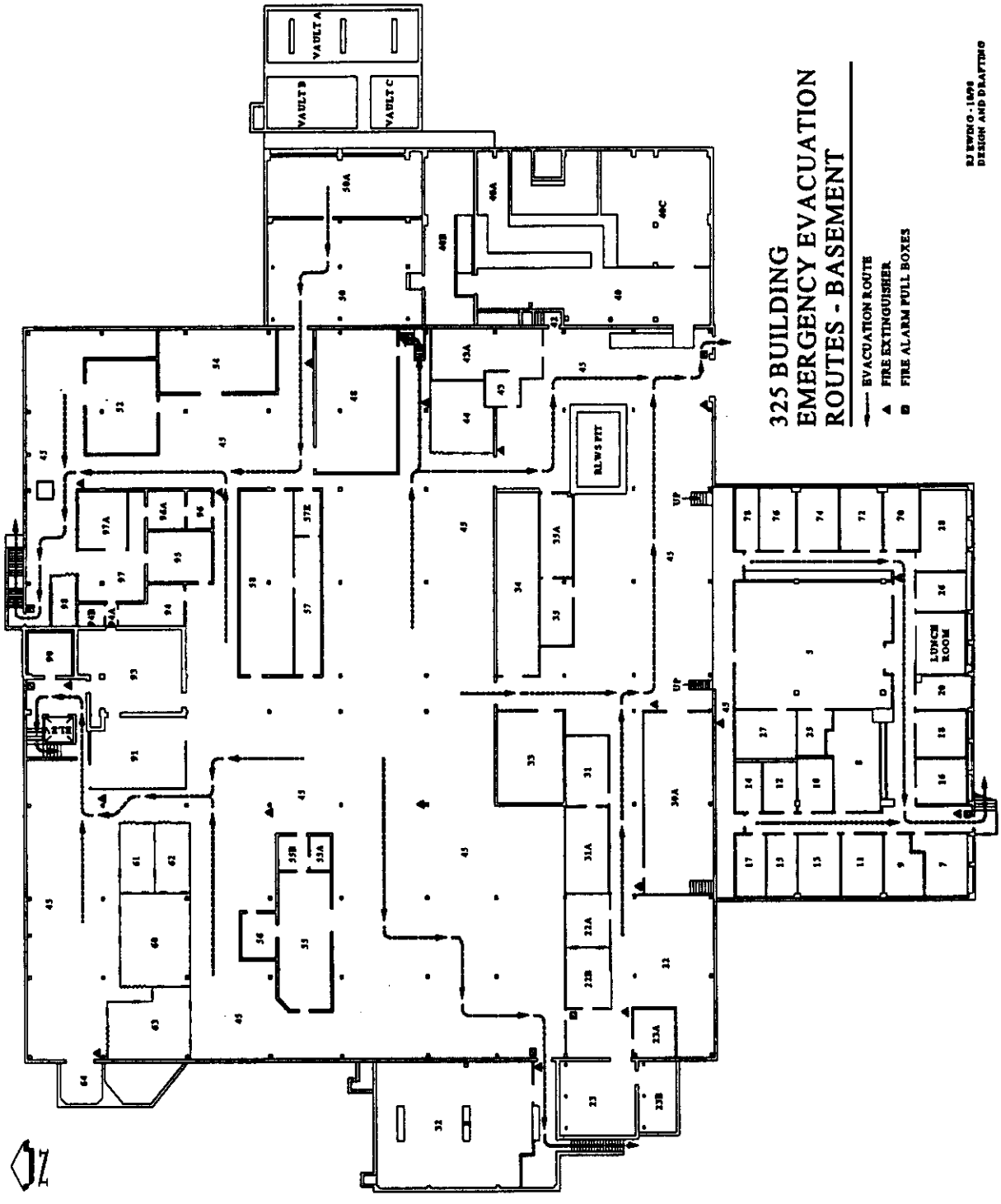
## 12.3.1 Evacuation Routes – 1st Floor



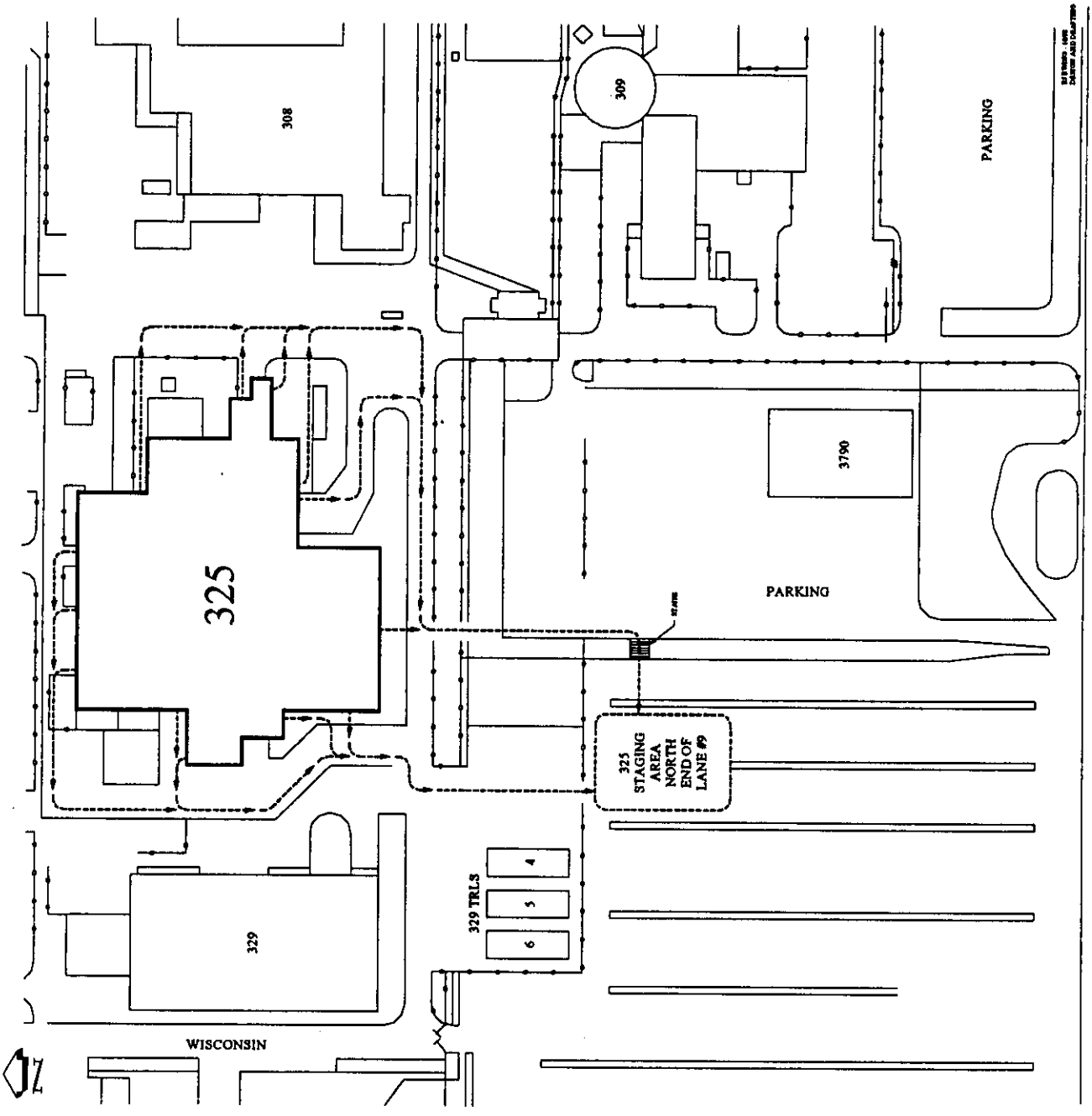
## 12.3.2 Evacuation Routes – 2nd and 3rd Floors



## 12.3.3 Evacuation Routes – Mezzanine and Basement



## 12.3.4 RPL Staging Area



# Exhibit 12.4 – Building Emergency Director Checklist for Hazardous Facilities

The BED manages facility operations and personnel, and is responsible for ensuring implementation of appropriate emergency procedures. Activities include direct configuration control over facility systems and components, allocations of plant personnel to conduct facility specific emergency response actions (within the affected facility boundary), categorization and reporting of the incident, and directing implementation of initial preplanned area/site protective actions. The BED is responsible for completing the following check listed duties for non-declared, RCRA, and DOE declared emergencies as appropriate.

During DOE declared emergencies, the shaded duties are required to be implemented.

Maintain a log of all activities, conversations and both directives given and received.

**IMMEDIATE ACTIONS**

1. ___ Upon initial discovery/notification complete the following:

   - Stop non-emergency activities in the event scene hazard area
   - Warn personnel in event scene hazard area
   - Call 375-2400.

   Determine and initiate mitigation actions that cannot be delayed without threatening human health and/or the environment.

   If available, direct a facility knowledgeable person(s) to meet and collocate with arriving emergency responders and perform the Facility Operations Specialist (FOS) checklist.

   - If a Facility Operations Specialist is not available, personnel act as the facility point-of-contact at the incident scene hazard area and perform the FOS checklist.

2. ___ Implement protective actions for facility personnel (i.e., take cover/evacuate).

   Assign door monitors as appropriate at access points during a take cover, to inform personnel of potential hazardous conditions.

   | |
   |---|
   | The BED (until IC arrives) may permit coordinated personnel movement during protective actions. |

## Exhibit 12.4 – Building Emergency Director Checklist for Hazardous Facilities (contd)

3. ___ IF there is a chemical/radiological release that immediately threatens nearby facilities:

   - Initiate a take cover for the affected area, by calling 375-2400 or by calling the Patrol Operations Center (POC) at 911 (if using a cell phone to contact the POC dial 373-3800).

   | Personnel arriving at Hanford Patrol access control points will be required to obtain BED (until IC arrives) approval and safe routes of travel before being allowed to proceed to the ICP. |
   |---|

   - Direct the Hanford Patrol to isolate the affected area.

4. ___ Provide location and recommended safe route to facility operations personnel meeting emergency responders.

5. ___ Establish an initial ICP and report location to the SPC 375-2400.

   - Assign Communicator and begin assigning other initial ICS functions as required to meet the needs of the incident

6. ___ Refer to facility specific EAL appendices for recognizing and classifying emergencies and/or event classification descriptions for event classification.

   IF the EAL criteria is met:

   - Direct the ICP Communicator to implement check-listed duties.

     NOTE: If the ICP Communicator is not available, delegate completion of the RL Notification form to the ONC.

   - Ensure the POC has implemented onsite protective actions.

   - Review items 1-9 on the RL Notification form once completed. Correct any discrepancies as necessary.

   - Sign in approval block and note time of declaration of event classification.

   - Return RL Notification form to ICP communicator for transmittal to ONC.

   - Proceed to Step #7.

IF the EAL criteria is not met:

- Ensure the ONC (376-2900) is notified for evaluation of event against "not classified event" notification criteria.
- Proceed to step #7.

7. ___ IF incident involves a spill, release, fire, or explosion, or exceeds environmental permits,

   THEN notify Environmental Services Integration and follow your contractor specific spill/release notification process or procedure. (Contact the SPC for a Prime Contractor specific single-point-of-contact if necessary).

**FOLLOW-UP ACTIONS**

8. ___ Ensure occurrence reporting requirements per the appropriate contractor procedure in accordance with RLID 232.1A, "Notification, Reporting, & Processing of Operations Information" are initiated.

9. ___ Confirm that facility personnel accountability has been conducted and evacuated personnel (if any) have been moved to a safe location.

10. ___ Provide initial briefing to IC and ICP personnel including:

    - Potentially affected personnel
    - *Incident and facility conditions*
    - Notifications (environmental/emergency and person or agency contacted)
    - Protective actions implemented
    - Status of event classification
    - Mitigation efforts underway
    - Accountability status of facility personnel
    - Status of injured, contaminated or exposed personnel

- Status of assigned ICS functions
- Status of shutdown equipment.

| |
|---|
| At the completion of turnover from the BED to the IC, the IC shall assume responsibility for command and control of the incident. |

11. ___ Coordinate the establishment of operations protocols with the IC based on the availability of personnel.

    - Discuss location of Resource Staging Area.
    - Assist IC in assigning other functional components of the ICP, as necessary.

12. ___ Contact the SPC and direct the following:

    - Inform the RL ICP Representative of facility incident status and location of the ICP.
    - If the facility RL ICP Representative is not available, direct the SPC to contact the divisional on-call DOE representative listed in the Site Weekly On-Call Directory.
    - If the Site Weekly On-Call List is not available, contact the ONC (dial 376-3030).

13. ___ IF the IC directs you to conduct a turnover briefing with the SED,

    THEN dial 376-6185 and provide a briefing as previously outlined above.

14. ___ Upon RL-EOC becoming operational, transfer the responsibility for event classification and ensuring the implementation of onsite protective actions to the SED after providing turn over briefing.

15. ___ Ensure the IC is kept informed on the status of facility personnel and activities.

16. ___ IF any personnel are deceased, injured, contaminated, potentially exposed, or transported by ambulance and the RL-EOC is not activated,

    THEN notify the EDO, via the ONC (at 376-2900) to have the Health Advocate notified.

- Cellular telephone or radio users shall not use the name(s) or payroll number(s) of involved personnel.

17. ___ IF any personnel are deceased, injured, contaminated, potentially exposed, or transported by ambulance and the RL EOC is activated:

    THEN notify the POC and the ICP Communicator. In both cases, provide the name(s), payroll number(s) and circumstances of the incident.

    - Cellular telephone or radio users shall not use the name(s) or payroll number(s) of involved personnel.

18. ___ Participate in ICP briefings as required (IC may have BED lead ICP briefings).

19. ___ Discuss event reclassification with the IC and Liaison Officer (EDO), and provide recommendation to the SED (dial 376-6185) if warranted by incident conditions.

20. ___ When the incident is stabilized, participate in a debriefing with the IC and take actions to return facility to normal operations.

    **NOTE**: Refer to Exhibit 12.13 "Emergency Closeout Duties" for check list items to consider before any recommendation is made to terminate a declared emergency.

21. ___ When incident is stabilized, refer to RLEP 3.4, Event Termination, Reentry and Recovery, to coordinate termination of the emergency.

22. ___ Ensure all hazardous material generated is handled appropriately and that incompatible waste is handled or stored in the area until necessary cleanup has occurred.

23. ___ Ensure the Environmental Support Contact is notified (376-0499) if the event involved a hazardous material spill/release and that the event is logged in the HWTU operating record.

## Exhibit 12.5 – ICP Communicator Checklist for Hazardous Facilities

The ICP Communicator is the individual responsible for:

- Completing and transmitting the RL Notification Form to the ONC
- Phoning the POC at 911 to conduct a line by line review of the RL Notification Form (the ONC Duty Officer immediately transmits the form to the POC)
- Maintaining a communication line with the Event Scene Liaison in the RL-EOC throughout the incident.

The ICP Communicator must ensure that the IC and BED are aware of all transmitted and received information. As a precautionary measure, the BED ensures that this position is staffed for all events, however for the purposes of this checklist, the ICP Communicator is responsible for implementing the following check listed duties for non-declared, RCRA, and DOE declared emergencies, as appropriate. During DOE declared emergencies the shaded duties are required to be implemented. Maintain a log of ICP communications.

1. ___ Upon notification, and after receiving safe routes of travel, respond to the ICP as soon as practical and receive incident status from the BED.
    - Assist the BED with event communications.
2. ___ Get a current copy of RL Notification Form (RL-F-5540.1).
3. ___ Get current area meteorological data.
    - Contact the Pacific Northwest National Laboratory Weather Station (373-2710 or 373-2716 – 24 hours Mon-Fri, 0600-1400 hrs on weekends/holidays).
    - Record the wind speed (in miles/hour), direction (from/to), and stability class on the RL Notification Form.
    - If meteorological data is not available, enter the words "Not Available" in Section 8 of the RL Notification Form.
    - Provide meteorological data to ICP Hazards Assessors.

## Exhibit 12.5 – ICP Communicator Checklist for Hazardous Facilities (contd)

4. ___ Complete items 1 – 9 of RL Notification Form, as known.

   - Obtain BED review, signature, and time of declaration of classification.

   **NOTE**: For DOE Alert level or higher declared events, Event Classifier reporting duties are no longer required.

   - FAX completed RL Notification form to the ONC on 376-3781.
   - Dial 911 and make notification of declared emergency (Cell Phone dial 373-3800)
   - Wait for the POC to initiate the POC/ONC conference bridge, and provide the ONC Duty Officer the information listed in items 1 – 9 from the RL Notification Form.

5. ___ Ensure POC initiates onsite protective actions per the quick reaction checklists, and that the ONC initiates offsite notifications.

6. ___ IF during the incident, the emergency class is upgraded AND the RL EOC is NOT operational,

   THEN repeat check listed duties 2 – 5 above.

7. ___ Establish the ERO Communication Line.

   - Dial 372-8145.
   - Identify yourself as the ICP Communicator.
   - When the RL-EOC Event Scene Liaison comes on the line you will hear a series of beeps.
   - Serve as the ICP Communicator providing continuous incident status over the ERO Communication Line.

8. ___ When the RL EOC is activated, inform the BED and IC.

## Exhibit 12.5 – ICP Communicator Checklist for Hazardous Facilities (contd)

9. ___ Provide the RL-EOC Event Scene Liaison a status on the following:

   - Protective actions implemented by facility.
   - Protective action requested of other organizations (i.e., HPD, HFD).
   - Incident conditions.
   - Mitigative actions.
   - Injured, deceased, contaminated, or potentially exposed personnel, and personnel transported by ambulance.

10. ___ Direct information requests from the RL-EOC to the IC and BED.

    **NOTE**: If the EOC is manned, the Assistant Communicator should establish a communications link with the PNNL Technical Support Representative – (376-7148)

11. ___ Relay ICP requests for resources over the ERO Communication Line.

    - Most resource requests should be provided to you to pass over the communication line, however, other ICP functions (i.e., Logistics, Planning) may make resource requests over this line if necessary.

12. ___ Participate in ICP briefings as required.

# Exhibit 12.6 – ICP Hazards Assessor Checklist for Hazardous Facilities

This checklist has two parts: 1) Radiological Hazards Assessor and 2) Chemical Hazards Assessor.

## 12.6.1 Part 1, Radiological

The Radiological Hazards Assessors are responsible for coordinating and ensuring accomplishment of radiological control functions throughout the scene. This position reports to the Operations Section Chief at any assigned location. The affected facility's radiological control manager or equivalent will fill this position. The Hazards Assessor is responsible for implementing the following check listed duties for non-declared RCRA and DOE Declared emergencies, as appropriate. During DOE declared emergencies, the shaded duties are required to be implemented. Maintain a log of your activities, conversations and both directives given and received. Ensure that a log of RCT activities is maintained.

1. ___ Upon notification, and after receiving safe routes of travel, report to the assigned location.

| |
|---|
| Specifically request the location and any pertinent information related to personnel who may have received a radiological exposure. |

2. ___ Ensure the following initial tasks are completed:

   - Perform initial assessment of hazards (i.e., source term identified, stack samples collected)
   - Estimate boundary of plume
   - Identify radiological constituents
   - Coordinate PPE requirements for personnel entering plume
   - Assist in development of monitoring requirements to detect radiological material
   - Understand known radiological and weather conditions
   - Consider physical source term (steam, pressure systems, etc.).

3. ___ Establish monitoring to ensure initial and ongoing personnel radiological safety throughout incident scene.

   - This should be discussed with the ICP (Hanford Fire Dept.) Safety Officer.

## Exhibit 12.6 – ICP Hazards Assessor Checklist for Hazardous Facilities (contd)

- Monitor emergency worker exposure.

- Evaluate and determine need to perform habitability surveys throughout the incident scene. Habitability may include dose and contamination surveys, and if applicable, a high volume air sample. Inform the Operations Section Chief of habitability survey results and recommend moving any resources out of an area that is above background.

4. ___ Ensure that RCT resources are available to the Operations Section Chief to perform ingress and egress surveys as required.

5. ___ Support survey teams as required, providing safe routes of travel, recommended PPE, and necessary monitoring equipment.

6. ___ In conjunction with the Operations Section Chief, ensure that RCTs are available to control access, monitor for, and post the boundary of the radiological plume within the affected facility. If a plume is found, assure appropriate grab air samples are taken. Control access, monitor, and post the boundary of the radiological plume within the affected facility boundary.

   - If the release is projected to go beyond the affected facility boundary, the event has likely required an RL-EOC activation, and will require implementation of RLEP 3.16, Hanford Plume Assessment and Tracking.

7. ___ Provide radiological control support for mitigation activities throughout the event's duration.

8. ___ Ensure processing of potentially contaminated personnel inside the affected facility's boundary.

   - If the number of contaminated personnel exceeds available decontamination capability, initiate a response in accordance with RLEP 3.17, Large Group Survey Sort and Decontamination.

   - If there is an injured and contaminated worker that needs transportation to a local hospital, ensure that the POC is notified. The POC will in turn contact the HEHF On-Call Physician to implement RLEP 3.18.

   - If there is a contaminated/deceased worker, assure that a recovery and decontamination plan is developed as described in RLEP 3.19.

# Exhibit 12.7 – Staging Area Supervisor Checklist

The Facility Staging Area Manager is responsible for coordination of actions at the facility staging area. This position is staffed by a facility representative. The list below is not designed to be all encompassing, nor is it necessary to perform each of these actions in sequence. The Facility Staging Area Manager is responsible for implementing the following check listed duties for non-declared, RCRA, and DOE declared emergencies, as appropriate. Maintain a log of your activities or assign a log keeper.

1. ___ Upon notification of an emergency event requiring facility personnel to evacuate, proceed to the 325 Building staging area with the appropriate tools and information to perform the Staging Area Supervisor duties. Obtain PNAD sign-out sheet at the receptionist desk when exiting the facility to provide an accounting of visitors to the facility.

2. ___ Verify through the BED that the staging area is in a safe location.

3. ___ Segregate personnel in personal protective equipment (PPE) and direct RCTs to survey personnel in PPE.

4. ___ Collect Building Occupancy/Accountability status from Zone Wardens at staging area. (DO NOT re-enter the facility).

5. ___ Query staff at staging area to determine if hazardous processes are on-going in the facility.

6. ___ Determine if any personnel were injured or potentially exposed to hazardous materials. Communicate any positive responses to the BED

7. ___ Contact the BED to determine if the Northwest corner of the RPL needs to be manned.

   - Assign a Zone Warden to man the Northwest corner of RPL if necessary to control re-entry to the facility.

8. ___ Update personnel on the event status on a periodic basis.

9. ___ If notified to evacuate, identify all personnel with vehicle keys in their immediate possession. Match up people with rides. Verify destination and route with each driver.

10. ___ Use government vehicles to transport personnel in PPE, if required. Reserve vehicles for personnel with late shutdown duties.

## Exhibit 12.7 – Staging Area Supervisor Checklist (contd)

11. ___ In the event of an extended building evacuation during inclement weather, direct personnel to utilize the 3760 Building (old PNNL library) as an alternate staging areas.

12. ___ Perform turnover with the fire department staging officer upon his arrival to cover all information listed above.

# Exhibit 12.8 – Zone Warden Checklist

1. ___ For your zone determine if all personnel have left:

   - their assigned work areas in the facility
   - unoccupied spaces, such as stairwells, corridors, elevators, and closets.

2. ___ Perform a thorough room-by-room search (if safe to do so) to provide a high degree of assurance that the facility is free of personnel.

3. ___ Report the occupancy/accountability status to the Staging Area Supervisor and determine if aid or rescue is required.

4. ___ Ensure that disabled persons receive whatever assistance may be required for a safe and orderly evacuation.

# Exhibit 12.9 – Handling of Radiologically Contaminated/Deceased Worker Checklist

1. ___ Assure a plan is developed to assess victim(s) and surrounding area contamination levels, without compromising the event scene evidence.

2. ___ If the Emergency Operations Center (EOC) is activated, assure that victim and event scene data is communicated to the EOC and Unified Dose Assessment Center as described in RLEP 1.1. If not activated, assure that the victim and event scene information is communicated to the Occurrence Notification Center (ONC). Assure that the ONC informs the Department of Energy Senior Management Duty Officer, on-call HEHF Physician, Employee Health Advocate for PHMC contractors, and the appropriate points of contact for all other contractors.

3. ___ Upon the Coroners arrival, provide a briefing on radiological conditions and proper personal protective equipment required (if necessary) to enter the area of the victim(s).

4. ___ Discuss and implement a plan to decontaminate the victim with input from coroner, event contractor Human Resources, and Radiation Protection as a minimum. The plan should consider the following factors:

   - Determine mutually agreeable level of decontamination (Non detectable or ALARA) Consider the residual radiation level 30 centimeters from the body, and/or where the radioactivity is found on or in the deceased worker.

   - Determine with assistance from the event contractor Human Resources if there are any societal, religious, and/or cultural implications.

   - Request input from the Radiation Protection organization concerning the application of the NCRP 37 and 65 recommendations.

   - Consider the type and composition of casket and funeral (open or closed casket), if known.

   - Consider movement of deceased worker when appropriate.

   - Consider cold storage if decontamination cannot be readily completed.

   - Arrange for disposition and disposal of contaminated biological wastes.

   - Consider the radiological, biological, and other hazards to attending personnel.

## Exhibit 12.6 – ICP Hazards Assessor Checklist for Hazardous Facilities (contd)

9. ___ Provide radiological control support for contaminated and injured personnel (facility Radiological Control Technician is to accompany personnel to hospital in ambulance).

10. ___ IF the incident involves a transportation incident on the Site,

    THEN attempt to locate shipping papers or manifests to ensure the contents of the shipment can be verified.

11. ___ Review safety and health issues, concerns, and survey priorities with the survey team members.

12. ___ Ensure the data received has been converted to factor in the efficiency of the instrument or measurement (i.e., cpm to dpm, and air samples in mCi/cc).

13. ___ Assure that communication of incident scene radiological data with UDAC Hazards Communicator includes maps or drawings of the affected scene.

14. ___ Participate in ICP briefings as required.

### 12.6.2 Part 2, Chemical

This position is filled by an Industrial Hygienist assigned to the HFD (HFD may use facility IH personnel if available until HFD IH personnel arrive), in support of the HFD HazMat Team HFD-Medical Staff, and HFD-Safety Officer who will provide technical expertise in chemical and toxicological hazard identification, evaluation, reactivity and dispersion modeling at the incident scene. The Industrial Hygienist may also serve as a chemical/decontamination Safety Officer, if designated by the IC. Activities will be conducted in accordance with this procedure and other internal HFD procedures as applicable. The Hazards Assessor is responsible for implementing the following check listed duties for non-declared, RCRA, and DOE declared emergencies, as appropriate. During DOE declared emergencies, the shaded duties are required to be implemented. This position may be staffed for non-declared, RCRA, and DOE declared emergencies as necessary. Maintain a log of your activities, conversations and both directives given and received.

1. ___ Upon notification, and after receiving safe routes of travel, report to the assigned location.

| |
|---|
| Specifically request the location and any pertinent information related to personnel who may have received a chemical exposure. |

## Exhibit 12.6 – ICP Hazards Assessor Checklist for Hazardous Facilities (contd)

2. ___ Support the Operations Section Chief to provide chemical monitoring for purposes of initial hazard evaluation ("size up") to ensure protection of emergency responders, ICP habitability, and to monitor habitability changes in the incident scene.

3. ___ Recommend and execute chemical sampling strategies for purposes of incident characterization, determination of employee exposure, and subsequent analysis of the incident.

4. ___ IF the incident involves a transportation incident on the Site:

   THEN attempt to locate shipping papers or manifests to ensure the contents of the shipment can be verified.

5. ___ Obtain a Material Safety Data Sheet (MSDS) for the involved chemical(s) and ensure a copy is provided to the HFD Medical Staff.

6. ___ In conjunction with the Radiological Hazards Assessor, make recommendations on respiratory protective equipment and other PPE for chemical and physical hazards to the ICP (Hanford Fire Department) Safety Officer.

7. ___ Support the HFD in the on-scene assessment and methodology for decontamination of ambulatory and non-ambulatory patients and/or equipment when the event involves chemical or mixed hazards.

8. ___ Recommend additional resource needs (IH support, equipment or PPE) to the Operations Section Chief.

9. ___ Address safety and health issues of emergency response team.

10. ___ Communicate with the IC, BED, HazMat Team, Safety Officer and others as necessary.

11. ___ Participate in ICP briefings as required.

12. ___ Throughout the incident and as information becomes available, communicate with the ICP Hazards Communicator for the purpose of providing information to the UDAC.

## Exhibit 12.9 – Handling of Radiologically Contaminated/Deceased Worker Checklist (contd)

- Determine method(s) of decontamination (consider use of the Hanford Fire Department Mobile Decontamination Facility).

- Evaluate the event investigation implications.

5. ___ Assure decontamination of the victim is completed in accordance with the decontamination plan.

6. ___ Move the victim to appropriate staging area if in a radiation or contamination area, while awaiting transportation to designated funeral home.

7. ___ Clean the area and handle, label, and dispose of the decontamination waste as biological hazardous material. The waste is disposed as radiological waste but labeled as biological hazardous material.

8. ___ Assure that the HEHF psychologist is notified and dispatched to address the workers who decontaminated the worker and were involved in the incident, if needed.

9. ___ Maintain a chronological log of all interfaces and activities. Collect and maintain copies of documentation and activity logs from the event.

## Exhibit 12.10 – Emergency Checklist for Emergency Management Support Group

The Management Support Group will use the following checklist to support the BED in managing the administrative aspects of the event.

| Item | Yes | No | Comment |
|---|---|---|---|
| Has 375-2400 been notified? | | | |
| Have all building occupants been accounted for?<br>PNNL staff?<br>PNNL visitors?<br>Other Contractor personnel?<br>Consultants, vendors, others? | | | |
| Have any persons received injuries or been subjected to conditions requiring medical attention?<br>If Yes, has medical attention been arranged? | | | |
| Has the BED classified the event?<br>Alert<br>Site<br>General | | | |
| Has activation of the EOC been requested? | | | |
| Do any persons require medication for non-event Reasons (e.g., heart medicine)? | | | |
| Has access control been initiated by Patrol? | | | |
| Has the Area Operations Manager/Facility Manager been notified? Has he reported to the event scene? | | | |
| Has a location for the ICP been established? | | | |
| Has location for the Management Support Group Been established and communicated to the HFD, HP, and the EOC? | | | |
| Has an open line to the EOC been established? (EOC PNNL Technical Support Representative: 376-7148) | | | |
| Has the Emergency Duty Officer made contact With the BED? | | | |
| Has event log been set up? | | | |
| Are additional staff required for support?<br>Clerical<br>Technical?<br>Other? | | | |

## Exhibit 12.10 – Emergency Checklist for Emergency Management Support Group (contd)

| Item | Yes | No | Comment |
|---|---|---|---|
| Has the Incident Commander established a schedule for periodic briefings? | | | |
| Are additional RCTs required? | | | |
| Is there a need for a facility inventory?<br>Chemical-hazardous, toxic, flammable?<br>Radio chemical?<br>Nuclear or fissile material?<br>If inventory information is required, contact the following:<br>Chemical inventory – 376-0812<br>– 372-1043 or 375-6315<br>Nuclear/fissile – Safeguards & Security<br>Duty Officer or Cognizant operations staff | | | |
| Has Public Relations been notified? | | | |
| Has DOE Headquarters been notified? | | | |
| Has EOC contacted other facilities not immediately involved? | | | |
| Is technical or operational spokesperson needed?<br>If so, has he/she been contacted? | | | |
| Has Program Manager been notified? | | | |
| Will relief staff be required for the Incident Command Post (Event and Support Teams)? | | | |
| Is transportation needed?<br>Available? | | | |
| Is there a need for additional equipment or supplies (including food)? | | | |
| Has PNNL Security made arrangements with Patrol for access of special equipment (radios, cellular telephones)? | | | |
| Are additional radiation instruments required?<br>What type?<br>How many of each type? | | | |
| Is the Hazardous Materials (HazMat) team needed? | | | |

## Exhibit 12.11 – Facility Operations Specialist – Check-Listed Duties

The individual, when assigned by the BED, is responsible to ensure that immediate mitigative actions that cannot be delayed without threatening human health and/or the environment, are taken at the event scene. The Facility Operations Specialist (FOS) is responsible for meeting emergency responders at the event scene and providing information on event status and initial actions that are underway. This position is normally filled by the BED or his/her designee. The FOS is responsible for implementing the following check listed duties for non-declared, RCRA, and DOE declared emergencies, as appropriate. Maintain a log of your activities, conversations and directives given and received.

1. ___ Obtain briefing on operational/mitigative activities and obtain any necessary facility specific procedures, utility disconnects, etc.

2. ___ Following BED briefing, and after receiving safe routes of travel, respond to a safe location upwind of the event scene.

   - Ensure personnel who were in the immediate area are accounted for and located in a safe, upwind area
   - Ensure that first aid is administered as-soon-as possible
   - Begin segregation of any contaminated personnel.

3. ___ Meet emergency personnel responding to the event scene and provide information on event status and initial actions underway. Collocate with the HFD/Hanford Patrol Operations Section Chief upon their arrival and act as the facility point-of-contact at the incident scene hazard area.

4. ___ Assist the HFD/Hanford Patrol Operations Section Chief with development of a mitigation plan by providing facility expertise.

5. ___ Identify, contact, and supervise additional facility personnel as required to Support Operations Section activities.

Coordinate with HFD/Hanford Patrol Operations Section Chief to ensure that all facility emergency responders are wearing appropriate PPE for assigned tasks.

# Exhibit 12.12 – RL Emergency Notification Form

RL-F-5540.1
(02/99)

U.S. DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE

**NOTIFICATION FORM** | Notification No.

1. NOTIFICATION PROVIDED BY: Name: _____ Phone: (509) _____
2. AREA AND FACILITY: _____ 3. TYPE EVENT: a. ☐ Emergency b. ☐ Exercise/Drill
4. CLASSIFICATION/STATUS:
   a. ☐ Initial Classification b. ☐ Reclassification c. ☐ Termination d. ☐ PAR Change/Addition e. ☐ Information
5. EMERGENCY CLASSIFICATION LEVEL AND PROTECTIVE ACTION RECOMMENDATIONS:

| AREA | a. ☐ ALERT EMERGENCY | b. ☐ SITE AREA EMERGENCY | c. ☐ GENERAL EMERGENCY |
|---|---|---|---|
| ☐ 100K | Evacuate Columbia River from White Bluffs to Vernita Bridge. | Evacuate Columbia River from White Bluffs to Vernita Bridge. | • Evacuate Columbia River from White Bluffs to Vernita Bridge.<br>• Evacuate Section 6, east of Hwy. 24. |
| ☐ 200 | None | Evacuate Columbia River from Vernita to Leslie Groves Park. | • Evacuate Columbia River from Vernita to Leslie Groves Park.<br>• Evacuate Sections 6, 8, and 7. |
| ☐ 300 | None | Evacuate Columbia River from White Bluffs to Howard Amon Park. | • Evacuate Columbia River from White Bluffs to Howard Amon Park.<br>• Evacuate 3 mile radius. |
| ☐ 400 | None | Evacuate Columbia River from White Bluffs to Leslie Groves Park. | Evacuate Columbia River from White Bluffs to Leslie Groves Park. |
| ☐ Others | None | None | None |

6. TYPE OF INCIDENT: *check all that apply*
   a. ☐ Fire b. ☐ Explosion c. ☐ Radiological d. ☐ Security e. ☐ Hazardous Materials f. ☐ Electrical
   g. ☐ Other EAL Used for Classification: DOE-0223, RLEP 1.0, Appendix 1-
   Description of Incident: _____
7. RELEASE INFORMATION:
   a. ☐ No Release
   b. ☐ Airborne Release Estimated Start Time of Release
   c. ☐ Spill _____
   d. ☐ Release to Columbia River
   e. ☐ Unknown Assumed Duration of Release
   f. ☐ Release Terminated _____
8. METEOROLOGICAL DATA:
   Wind Speed _____ mph
   Wind Direction: from _____ toward _____
   Precipitation: ☐ Yes ☐ No
   Stability Class:
   A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐
9. PROGNOSIS OF SITUATION:
   a. ☐ Unknown b. ☐ Stable c. ☐ Escalating d. ☐ Improving

**FOR EOC USE ONLY**

10. ADDITIONAL OFFSITE PROTECTIVE ACTION RECOMMENDATIONS:
11. BASIS FOR ADDITIONAL OFFSITE PROTECTIVE ACTION RECOMMENDATIONS:
    a. ☐ Security c. ☐ Hazardous Materials Release
    b. ☐ Facility Condition d. ☐ Other _____

APPROVED: _____ DATE: _____ TIME: _____

# Exhibit 12.13 – Emergency Closeout – Check-Listed Duties

The following emergency closeout check listed items are to be referred to by the BED, Operations Section Chief, FOS, and the IC before recommending termination of a declared emergency.

ICP Initials

1. ___ Initiating condition is (circle one): a) Stabilized b) Corrected

   - Damage to facilities and/or process-related systems and equipment are stabilized or corrected, and there is a high probability that it can be maintained in that condition.
   - Radiation or hazardous material exposure levels within the affected facility are corrected, stable or decreasing with time.
   - Injured personnel have been properly treated and/or transported to medical facilities.

2. ___ Radiation or hazardous material exposure levels within the affected facility or area(s) are stable or decreasing with time.

3. ___ Fire, flood, earthquake, or similar emergency conditions no longer constitute a hazard to critical systems/equipment or to personnel.

4. ___ Security of the affected facilities is controlled.

5. ___ Release of hazardous material offsite or beyond controlled areas onsite have ceased or are controlled within permissible regulatory limits, and the potential for an uncontrolled release is low.

6. ___ Access control has been established to prevent inadvertent or uncontrolled entry into (1) the event scene and (2) facilities and areas that were contaminated during the event.

7. ___ Existing conditions no longer meet the established Emergency Action Levels for the facility/site, and it appears unlikely that conditions will deteriorate.

**Note**: The following emergency closeout checklist items are to be referred to by the RL-EOC Site Emergency Director prior to recommendation to terminate.

# Appendix A

## DOE-0233 Recognizing and Classifying Emergencies
## RLEP 1.0 – Appendix 1-PNNL.325

# Appendix A

# DOE-0233 Recognizing and Classifying Emergencies
# RLEP 1.0 – Appendix 1-PNNL.325

## A.1 Index of Emergency Conditions

## A.2 Facility Emergency Events

**Table 1A.** Generic Emergency Classification Criteria (ALERT)

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| Classification criteria for Alert Level Emergency (any degradation of safety not otherwise directly covered in other specific EALs) | An Alert Level Emergency shall be declared when events are in progress or have occurred that involve an actual or potential substantial degradation of the level of safety of the facility,<br>**OR**<br>Substantial actual/potential degradation of level of protection or the loss or potential loss of special nuclear material (SNM)<br>**OR**<br>If you need assistance from the RL Emergency Operations Center to mitigate the event, or if you anticipate that Alert emergency conditions are imminent, declare an Alert. | **ALERT EMERGENCY** |
| **The information below is for the Unified Dose Assessment Center use only** | | |
| Classification criteria for Alert Level Emergency (any degradation of safety not otherwise directly covered in other specific EALs) | Any release of radioactive or chemical material meeting the following criteria:<br>RADIOACTIVE MATERIAL RELEASE:<br>Projected dose greater than a 100 mrem total effective dose equivalent, calculated at the facility boundary,<br>**OR**<br>Chemical Material Release:<br>Exposure limits (air concentrations) greater than ERPG-1 but less than ERPG-2 at the facility boundary. | **ALERT EMERGENCY** |

**Table 1A.** Generic Emergency Classification Criteria (SITE AREA)

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| Classification criteria for a Site Area Emergency (and degradation of safety not otherwise directly covered in other specific EALs) | A Site Area Emergency shall be declared when events are in progress or have occurred that involve actual or likely major failures of facility functions needed for protection of workers and the public<br>**OR**<br>Actual malevolent acts resulting in major failures of protective systems. | **SITE AREA EMERGENCY** |
| The information below is for the Unified Dose Assessment Center use only. | | |
| Classification criteria for a Site Area Emergency (any degradation of safety not otherwise directly covered in other specific EALs) | Any release of radioactive or chemical material meeting the following criteria:<br>RADIOACTIVE MATERIAL RELEASE:<br>Projected dose greater than a rem total effective dose equivalent, calculated at the facility boundary.<br>**OR**<br>Chemical Material Release:<br>Exposure limits (air concentrations) greater than ERPG-2 at the facility boundary, but less than ERPG-2 at the Hanford Site boundary. | **SITE AREA EMERGENCY** |

**Table 1A.** Generic Emergency Classification Criteria (GENERAL)

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| Classification Criteria for a General Emergency (any degradation of safety not otherwise directly covered in other specific EALs) | A General Emergency shall be declared when events are in progress or have occurred that involve actual or imminent catastrophic failure of facility safety systems with a potential for loss of confinement or containment integrity<br>**OR**<br>Malevolent action resulting in catastrophic degradation of protection systems that could lead to substantial offsite impacts. | **GENERAL EMERGENCY** |
| The information below is for the Unified Dose Assessment Center use only. | | |
| Classification Criteria for a General Emergency (any degradation of safety not otherwise directly covered in other specific EALs) | For any release of radioactive or chemical material meeting the following criteria:<br>RADIOACTIVE MATERIAL RELEASE:<br>Projected dose greater than a 1 rem total effective dose equivalent, calculated at the Hanford Site boundary<br>**OR**<br>Chemical Material Release:<br>Exposure limits (air concentrations) greater than ERPG-2 at the Hanford Site boundary. | **GENERAL EMERGENCY** |

**Table 1B.** Facility Fire

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| 325 Building Fire | A fire discovered within the 325 Building, with potential for affecting facility safety<br>**AND**<br>Has exceeded facility fire suppression system capability<br>**AND**<br>Requires Hanford Fire Department action for suppression. | **ALERT EMERGENCY** |
| A fire with a stack alarm | Fire affecting facility safety occurs with failure of all stages of HEPA filtration, as indicated by a confirmed 325 Bldg stack monitor alarm. | **SITE AREA EMERGENCY** |
| A 325 Building related fire | Events are in progress or have occurred that involve actual or imminent catastrophic failure of facility confinement or containment integrity. | **GENERAL EMERGENCY** |

**Table 1C.** Facility Explosion

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| A process explosion occurs. | Confirmed 325 Building explosion requiring evacuation of entire 325 Building. | **ALERT EMERGENCY** |
| A process explosion occurs. | Confirmed explosion within the 325 Bldg which has failed or threatens facility integrity. | **GENERAL EMERGENCY** |

NOTE: No Site Area Emergency class defined.

**Table 1D.** Loss of Radioactive Material Confinement

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| Hot Cell barrier degradation | A. unplanned/uncontrolled breach of the 325A/B Hot cells, as indicated by:<br>325 A/B Cell high pressure alarm<br>**AND**<br>Adjacent operation gallery CAM alarms<br>**OR**<br>325 Building stack monitor alarm. | **ALERT EMERGENCY** |
| Glovebox wall degradation | An unplanned/uncontrolled breach of a glovebox containing radiological materials, as indicated by:<br>Glovebox high pressure alarm<br>**AND**<br>Adjacent Laboratory CAM alarms<br>**OR**<br>325 Building stack monitor alarm. | **ALERT EMERGENCY** |
| Hot cell barrier degradation | An unplanned/uncontrolled breach of the 325 A/B Hot cells with resulting airborne release<br>**AND**<br>HEPA filtration system is not operational, or an alternate exhaust pathway to the exterior of the building exists. | **GENERAL EMERGENCY** |

**NOTE:** No Site Area Emergency class defined.

**Table 1E.** Hazardous Material Release

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| Unknown release of hazardous/toxic material | Any release of hazardous/toxic material to the building atmosphere which causes immediate adverse effects to building personnel<br>**AND**<br>Requires building evacuation. | **ALERT EMERGENCY** |

**NOTE:** No Site Area Emergency class defined.

**Table 1F.** Criticality

| Initiating Conditions | Emergency Action Level | Event Classification |
|---|---|---|
| Potential criticality event | Uncontrolled criticality event is judged likely by Facility Management and a Criticality Safety Engineer. | **ALERT EMERGENCY** |
| Potential criticality event | Criticality alarm annunciates<br>**AND**<br>Criticality event is confirmed by Health Physics or Operations personnel by indication of increase radiation readings or positive quick sort results. | **GENERAL EMERGENCY** |

**NOTE:** No Site Area Emergency class defined.

**Table 2C.** Range Fire

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| Range fire | A range fire has entered the 300 Area and has or is likely to enter the 325 Building. | **ALERT EMERGENCY** |

**NOTE:** No Site Area or General Emergency class defined.

## A.4 Security Contingencies

**Table 3A.** Explosive Device

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| Explosive device | A confirmed explosive device is located within the 325 Building. | **ALERT EMERGENCY** |
| Explosive device | A confirmed detonation of an explosive device within the 325 Building which has failed or threatens facility integrity. | **SITE AREA EMERGENCY** |
| Explosive device | A confirmed detonation of an explosive device within the 325 Building rooms containing hazardous materials and which has failed or threatens facility integrity. | **GENERAL EMERGENCY** |

**Table 3B.** Sabotage

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| Confirmed sabotage | Credible or confirmed physical damage to any safety system within the 325 Building as a result of sabotage. | **ALERT EMERGENCY** |

**NOTE:** No Site Area or General Emergency class defined.

**Table 3C.** Hostage Situation

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| Hostage situation | A confirmed hostage situation involving personnel is occurring within the 325 Building. | **ALERT EMERGENCY** |

**NOTE:** No Site Area or General Emergency class defined.

**Table 3D.** Armed Intruder/Security Threat

| Initiating Condition | Emergency Action Level | Event Classification |
|---|---|---|
| Armed intruder(s) security threat | Confirmed armed intruder(s) located in the 300 Area. | **ALERT EMERGENCY** |
| Security threat | Credible threat or ongoing severe security compromise involving physical attack on the 325 Building. | **ALERT EMERGENCY** |

**NOTE:** No Site Area or General Emergency class defined.

**Table 3E.** Aircraft Crash

| Initiating Condition | Emergency Action Level | Event Condition |
|---|---|---|
| Aircraft crash | An aircraft crash has occurred at or near the 325 Building, which has or is likely to have an adverse affect of the Building's safety, or has/is likely to release radioactive or hazardous materials. | **ALERT EMERGENCY** |

**NOTE:** No Site Area or General Emergency class defined.

**Table 3F.** Special Nuclear Material Incident

| Initiating Condition | Emergency Action Level | Event Condition |
|---|---|---|
| Special Nuclear Material (SNM) incident. | Confirmed diversion or theft of SNM at the 325 Building. | **ALERT EMERGENCY** |

**NOTE:** No Site Area or General Emergency class defined.

## A.5 Definitions

**American Industrial Hygiene Association (AIHA):** The organization that has responsibility for the development of exposure limits for non-radiological hazardous material.

**Area:** The designated administrative boundary intended for support of 300 Area missions.

**Emergency action level (EAL):** EALs originate from generic classification descriptions and are more specifically written for each hazardous facility, based upon specific, predetermined, observable indicators used to detect, recognize and determine the emergency class for operational emergencies. EALs can be an instrument reading; an equipment status indicator; a measurable parameter, onsite or offsite; a discrete, observable event; results of analysis; or other observed phenomenon indicative of an emergency class declaration.

**Emergency Response Planning Guideline (ERPG):** ERPGs are developed by the American Industrial Hygiene Association (AIHA) to determine the appropriate emergency class for releases of non-radiological material. These guidelines will be used as the basis for non-radiological material releases. ERPG-1 and ERPG-2 exposure limits serve as emergency class indicators for the Hanford Site when available from the AIHA.

**ERPG-1** The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor (AIHA, 1990).

**ERPG-2** The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action (AIHA, 1990).

**Event**: As used in this procedure an event is an adverse condition that requires mitigative responses and may result in the declaration of an emergency.

**Event Classifications**: Establishes correlation of initiating conditions and event indicators with projected onsite and offsite consequences. For a description of the three types of event classification referred to as "Emergencies," see Table 1A.

**Facility boundaries**: The facility boundary may include any process building or hazardous materials handling facility's exterior walls, engineered containment, perimeter fences, barricades or barriers and at a distance of 100 meters from the exterior walls.

**Hanford Site boundary**: For the purposes of emergency preparedness, the Hanford Site is defined as the near (south and west) bank of the Columbia River from the intersection of the existing western most site boundary and the Columbia River, following the Columbia River to the south boundary of the 300 Area, and proceeding west and north along the existing site boundary. Based on this definition, portions of the existing Hanford Site that fall within Grant and Franklin Counties are considered outside of the site boundary.

**Initiating condition**: Operational status which may indicate a potential condition requiring emergency response.

**Total Effective Dose Equivalent**: The sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures). Deep dose equivalent to the whole body may be used as effective dose equivalent for external exposures.

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# Appendix B

# 300 Area Protective Actions

# Appendix B

# 300 Area Protective Actions

## B.1 Alert Emergency

1. Assure that all affected facility personnel "take cover" or evacuate.

2. Verify that the POC completes the following items contained in the 300 Area checklist for Alert Emergencies:

   - Activates 300 Area's Emergency Alerting System

   - Crash alarm message to "take cover" provided to 300 Area, and all 600 Area residents in areas adjacent to the incident scene

   - Restricts access at WNP-1 Access Road and Route 4S, and at the Horn Rapids intersection with George Washington Way and Horn Rapids intersection with Stevens Drive

3. Plan for subsequent 300 Area evacuation as required.

## B.2 Site Area/General Emergency

1. Verify that all Alert Emergency protective actions are implemented.

2. Plan for area evacuation (RL-EOC will provide evacuation instructions).

3. Verify that the POC has initiated Columbia River Alerting.

# Appendix C

# Hazards Assessment

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# Appendix C

# Hazards Assessment

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## Figures



## Tables

## C.1 Introduction

This report documents the emergency preparedness hazards assessment for the 325 Building located in the 300 Area of the U.S. Department of Energy (DOE) Hanford Site. The 325 Building Applied Chemistry Laboratory is part of the Pacific Northwest National Laboratory (PNNL), operated by Battelle Memorial Institute under contract to DOE.

This hazards assessment was conducted to provide the emergency planning technical basis for the facility. DOE Order 5500.3A requires that an emergency planning hazards assessment be performed for each facility that has the potential to reach or exceed the lowest level emergency classification.

Much of this document was taken from a draft Safety Analysis Report (PNL-7748) for the 325 Building. This Safety Analysis Report (SAR) will be reformatted to comply with DOE 5480.22 and DOE 5480.23 before formal issue but was used as a basis for this hazards assessment since it is the most complete and current safety analysis of the building. The draft SAR is referred to as PNL-7748 in the remainder of this document.

## C.2 Building Description

Detailed descriptions of the Hanford Site and the 325 Building are found in the Hanford Site characterization document (Cushing 1992) and PNL-7748. The following brief summary is derived from those descriptions.

### C.2.1 Facility Mission

The 325 Building Applied Chemistry Laboratory is a general purpose, nuclear research and development laboratory. The building provides specially shielded, ventilated, and equipped laboratories for radiochemical analyses and nuclear process development studies. Because the 325 Building is a Research and Development (R&D) facility, the work being done in the building changes as programs are concluded and others are started.

### C.2.2 Location

The 325 Building is located in the southern part of the 300 Area (Figure C.1) of the DOE Hanford Site. The nearest site boundary (the 300 Area fence) is 580 meters east of the 325 Building. The nearest possible resident is 1600 meters east across the Columbia River.

The 300 Area is located in the south-eastern corner of the 560 square mile DOE Hanford Reservation in the south central part of the State of Washington along the west bank of the Columbia River (Figure C.2). The size of the Hanford Site will be reduced in 1994. The new boundary will likely be the Columbia River on the north and highway 240 on the south. In addition to the 300 Area, the Hanford Site contains the following major facilities or activities: six reactor areas designated 100-B/C, 100-N,

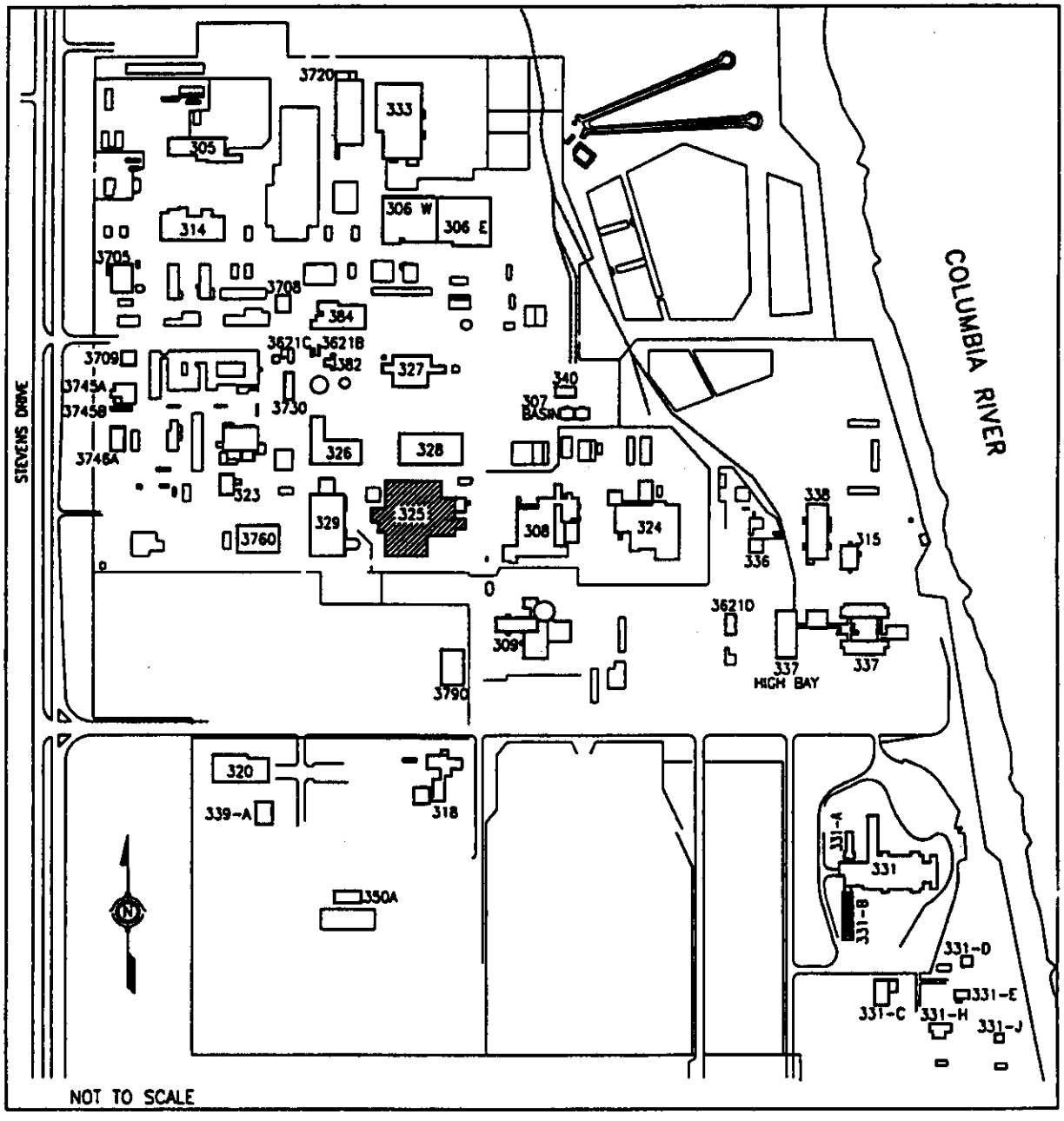


Figure C.1. 300 Area

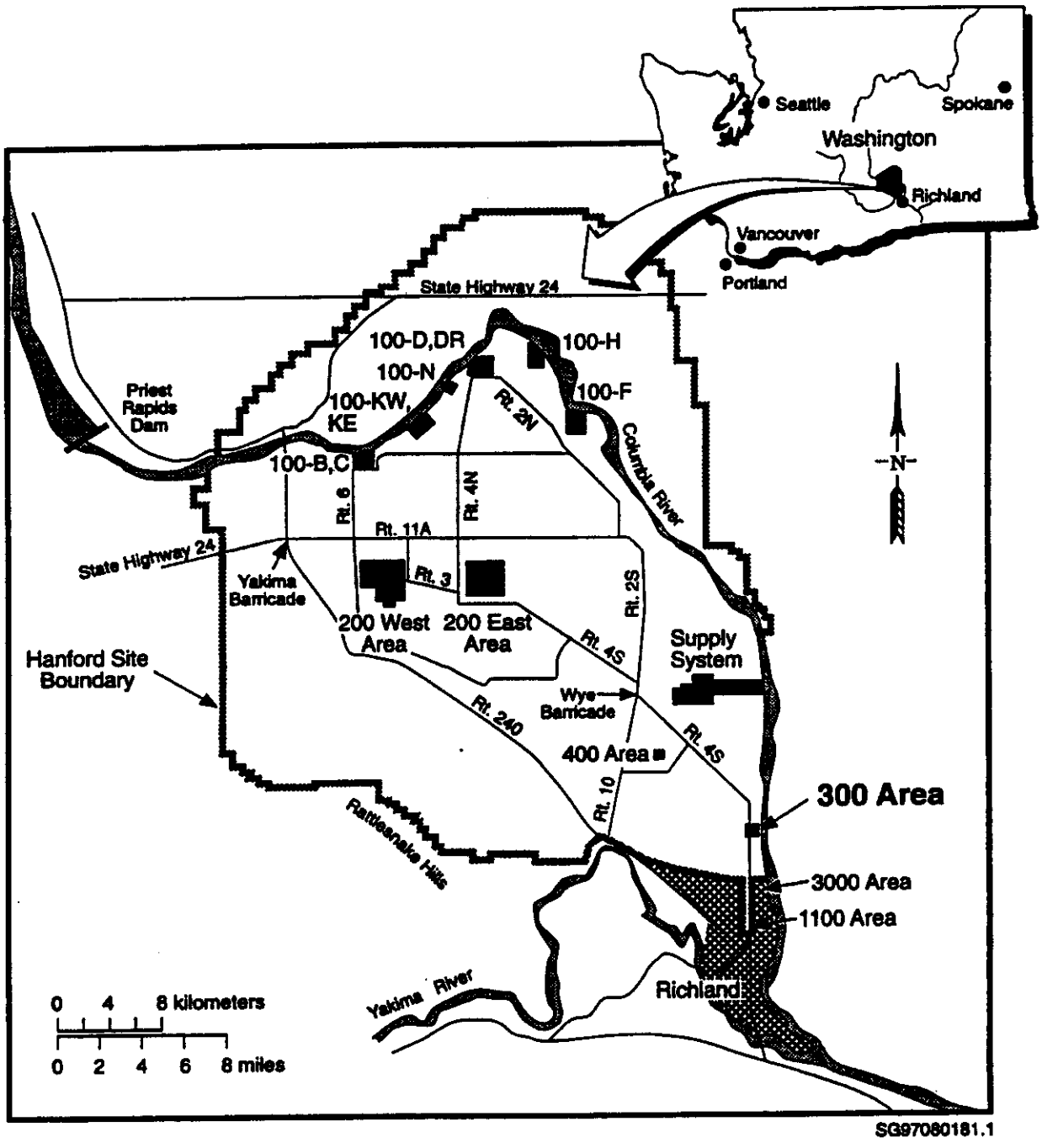


**Figure C.2.** Hanford Site Location

100-KE/KW, 100-D/DR, 100-H, and 100-F, which contain eight shutdown production reactors and one shutdown dual purpose reactor (N Reactor); two areas for waste processing and waste storage designated 200-E and 200-W Areas; a commercial nuclear waste burial operation on land leased to the State of Washington; the shutdown Fast Flux Test Facility (FFTF); and an operating Washington Public Power Supply System nuclear power plant. Major metropolitan areas within the broad vicinity of Hanford include Spokane, Washington, about 120 air miles to the northeast; Seattle, Washington, about 130 air miles to the northwest; and Portland, Oregon, about 150 air miles to the southwest. Two other areas of significant population density include Moses Lake, Washington, about 30 miles north of the K-area and the Yakima Valley, in Washington, extending from Yakima, about 45 miles west of Hanford, to the Tri-Cities, in Washington. The nearest of the Tri-Cities, Richland, is immediately south of the 300 Area.

### C.2.2.1 Floods

Large Columbia River floods have occurred in the past (DOE 1987), but the likelihood of recurrence of large-scale flooding has been reduced by the construction of several flood control/water storage dams upstream of the Site. Major floods on the Columbia River are typically the result of rapid melting of the winter snow pack over a wide area augmented by above-normal precipitation. The maximum historical flood on record occurred June 7, 1894, with a peak discharge at the Hanford Site of 21,000 cubic meters per second (cms) (742,000 cubic feet per second (cfs). The 325 Building is not in the flood plain associated with the 1894 flood. The largest recent flood took place in 1948 with an observed peak discharge of 20,000 cms (706,280 cfs) at the Hanford Site. The probability of flooding at the magnitude of the 1894 and 1948 floods has been greatly reduced because of upstream regulation by dams.

There are no Federal Emergency Management Agency (FEMA) flood plain maps for the Hanford Reach of the Columbia River. FEMA only maps developing areas, and the Hanford Reach is specifically excluded.

There have been fewer than 20 major floods on the Yakima River since 1862 (DOE 1986). The most severe occurred in November 1906, December 1933, and May 1948; discharge magnitudes at Kiona, Washington, were 1,870, 1,900, and 1,050 cms (66,000, 67,000, and 37,000 cfs), respectively. The recurrence intervals for the 1933 and 1948 floods are estimated at 170 and 33 years, respectively. The development of irrigation reservoirs within the Yakima River Basin has considerably reduced the flood potential of the river. The 325 Building is not within lands susceptible to a 100-year flood on the Yakima River.

Evaluation of flood potential is conducted in part through the concept of the probable maximum flood (PMF), which is determined from the upper limit of precipitation falling on a drainage area and other hydrologic factors, such as antecedent moisture conditions, snowmelt, and tributary conditions, that could result in maximum runoff. The probable maximum flood for the Columbia River below Priest Rapids Dam has been calculated to be 40,000 cms (1.4 million cfs) and is greater than the 500-year flood. The PMF would probably surround the 300 area with water (see Figure 4.2-10 in Cushing 1992) but is not expected to inundate the 325 Building. According to projections by the U.S. Corps of Engineers, the

PMF would result in a groundwater level of 116 meters (382 feet) above maximum surface level (msl) at the 325 Building (the ground floor is 123 meters (402 feet) and the basement is 118 meters (387.5 ft) above msl).

The U.S. Army Corps of Engineers (1989) has derived the Standard Project Flood (SPF) with both regulated and unregulated peak discharges given for the Columbia River below Priest Rapids Dam. Frequency curves for both natural (unregulated) and regulated peak discharges are also given for the same portion of the Columbia River. The regulated SPF for this part of the river is given as 15,200 cms (54,000 cfs) and the 100-year regulated flood as 12,400 cms (440,000 cfs). No maps for the flooded areas are given.

Potential dam failures on the Columbia River have been evaluated. Upstream failures could arise from a number of causes, with the magnitude of the resulting flood depending on the degree of breaching at the dam. The U.S. Army Corps of Engineers evaluated a number of scenarios on the effects of failures of Grand Coulee Dam, assuming flow conditions of the order of 11,000 cms (400,000 cfs). For purposes of emergency planning, U.S. Army Corps of Engineers hypothesized that 25% and 50% breaches, the "instantaneous" disappearance of 25% or 50% of the center section of the dam, would result from the detonation of nuclear explosives in sabotage or war. The discharge or flood wave resulting from such an instantaneous 50% breach at the outfall of the Grand Coulee Dam was determined to be 600,000 cms (21 million cfs). In addition to the areas inundated by the probable maximum flood (see Figure 4.2-10 in Cushing 1992), the remainder of the 100 Areas, the 300 Area, and nearly all of Richland, Washington, would be flooded (DOE 1986; see also ERDA 1976). No determinations were made for failures of dams upstream, for associated failures downstream of Grand Coulee, or for breaches greater than 50% of Grand Coulee, for two principal reasons: The 50% scenario was believed to represent the largest realistically conceivable flow resulting from either a natural or human-induced breach (DOE 1986); that is, it was hard to imagine that a structure as large as the Grand Coulee Dam would be 100% destroyed instantaneously. It was also assumed that such a scenario as the 50% breach would only occur as the result of direct explosive detonation, not because of a natural event such as an earthquake, and that even a 50% breach under these conditions would indicate an emergency situation in which there might be other overriding major concerns.

The possibility of a landslide resulting in river blockage and flooding along the Columbia River has also been examined for an area bordering the east side of the river upstream from the city of Richland. The possible landslide area considered was the 75-meters- (250-feet-) high bluff generally known as White Bluffs. Calculations were made for an $8 \times 10^5$ $m^3$ ($1 \times 10^6$ $yd^3$) landslide volume with a concurrent flood flow of 17,000 cms (600,000 cfs) (a 200-year flood) resulting in a flood wave crest elevation of 122 meters (400 feet) above mean sea level. Areas inundated upstream from such a landslide event would be similar to those shown in Figure 4.2-10 of Cushing 1992.

In summary, the 325 Building is above the PMF flood plane and the likelihood of flooding is considered to be quite low. The emergency planning for major failures of upstream dams is beyond the scope of this Hazards Assessment.

### C.2.2.2 Seismology

The Hanford Site is in a region of low to moderate seismicity. The historic record of earthquakes in the Pacific Northwest dates from about 1840. The early part of this record is based on newspaper reports of structural damage and human perception of the shaking, as classified by the Modified Mercalli Intensity (MMI) scale, and is probably incomplete because the region was sparsely populated. Seismograph networks did not start providing earthquake locations and magnitudes of earthquakes in the Pacific Northwest until about 1960.

Large earthquakes (magnitude greater than Richter 7) in the Pacific Northwest have occurred in the vicinity of Puget Sound, Washington, and near the Rocky Mountains in eastern Idaho and western Montana. A large earthquake of uncertain location occurred in north-central Washington in 1872. This event had an estimated maximum MMI ranging from VII to IX and an estimated Richter magnitude of approximately 7. The distribution of intensities suggests a location within a broad region between Lake Chelan, Washington, and the British Columbia border. Seismicity of the Columbia Plateau, as determined by the rate of earthquakes and the historical magnitude of these events, is relatively low when compared to other regions of the Pacific northwest, the Puget Sound area and western Montana/eastern Idaho. In the central portion of the Columbia Plateau, the largest earthquakes near the Hanford Site are two earthquakes that occurred in 1918 and 1973. These two events had magnitudes of 4.4 and intensity V and were located north of the Hanford Site. For more information concerning the seismology and geology of this area, see Section 4.2.3 of the Hanford Site National Environmental Policy Act (NEPA) Characterization (Cushing 1992).

### C.2.2.3 Wind and Tornado

The Site is subject to frequent strong westerly winds. The all-time peak wind recorded at the Hanford Meteorology Station tower in the 200 West area at the 15-m level was a gust of 81 mph recorded January 11, 1972. The 80 mph gust is expected to occur once every 30 years. A peak of 85 mph would be expected to occur once every 100 years (Cushing 1992).

The Site is well outside of established tornado alleys. The probability of a tornado in any year at any point within the 100 mile radius of the Hanford Meteorology Station is $6.8 \times 10^{-6}$/yr (Stone 1972).

### C.2.2.4 Ashfall

The Hanford Site is in a region subject to ashfall from volcanic eruptions. The three major volcanic peaks closest to the project are: Mt. Adams about 100 miles away, Mt. Rainier at about 110 miles away, and Mt. St. Helens approximately 130 miles away.

Important historical ashfalls affecting this location were from eruptions of Glacier Peak about 10,000 BC, Mt. Mazama about 4000 BC, and Mt. St. Helens about 6000 BC. The most recent ashfall resulted from the May 18, 1980 eruption of Mt. St. Helens. Table C.1 below indicates the estimated ash depth deposited at the Hanford Site from past volcanic eruptions in the region.

Table C.1. Estimated Ash Depth at Hanford from Major Eruptions

| | | | Equivalent Roof Loading | |
|---|---|---|---|---|
| Volcano | Time | Depth of Ash | Dry (psf) | Wet (psf) |
| Glacier Peak | 12,000 B.P. | 1 in. | 6 | 8.4 |
| Mt. Mazama | 6,000 B.P. | 6 in. | 36 | 50 |
| Mt. St. Helens | 3,600 B.P. | 1 in. | 6 | 8.4 |
| Mt. St. Helens | 1980 | 0.5 in. | 3 | 4.2 |
| B.P. – Before Present | | | | |

## C.2.3 Facility Description

The 325 Building consists of 1) a central portion containing general purpose laboratories for low-level radiochemical work; 2) a south (front) wing containing office space, locker rooms, a lunch room and maintenance shops; and 3) east and west wings provided with shielded enclosures with remote manipulators (hot cells) for high-level radiochemical work. The exhaust fans and final stages of the high-efficiency particulate air (HEPA) filters are housed in a detached structure along the west side of the building at the north end. A storage area for potentially contaminated liquids is located in the vault below ground level along the east side of the building near the north end of the east wing.

The central portion of the building is 59.1 by 59.8 meter (194 by 196 feet) on three floors (basement, ground, and second) and contains over 100 laboratories and offices. The south wing is 22.6 by 40.5 meter (74 by 133 feet) on two floors and contains offices, a conference room, a machine shop, a lunch room, and rest rooms. The east wing (325A), housing the shielded process research hot cells, truck lock, and manipulator repair, is 14.6 by 39.6 meter (48 by 130 feet) with a 12.2 by 12.8 meter (40 by 42 feet) service area/truck lock addition, The west wing (325 B) is 16.2 by 16.5 meter (53 by 54 feet) and houses additional shielded process research hot cells.

The building frame is welded steel. The parapeted roof has a slightly sloped steel deck with gravel-finished roofing. Exterior walls are industrial-insulated panels of fluted steel.

### C.2.3.1 General Purpose Chemical Laboratories

These laboratories are located on the first floor and basement of the central portion of the 325 Building. The chemical, radiochemical and microstructural laboratories consist of approximately 70 rooms with a combined area of approximately 4,175 meters$^2$ (44,944 feet$^2$). Installed facilities include radiochemistry hoods, gloveboxes for transuranic materials, inert atmosphere gloveboxes, and laminar-flow clean hoods for analysis of sodium, lithium, and tritium.

Standard laboratories are multiples of 3.0- by 3.7-meter (10- by 12-feet) bays. Free-standing laboratory benches made of steel are arranged along the walls, with peninsulas in the large laboratories. The hoods have heavy stainless steel tray bottoms and steel bases. The hood sash moves over a bypass

for a constant volume rate of exhaust flow. Besides the hoods, many stainless steel gloveboxes are provided. The gloveboxes have individual HEPA filters located at the exhaust and intake ports. Gloveboxes and hoods exhaust through testable, self-contained, primary HEPA filters before exhausting through the general ventilation exhaust system. The general exhaust system to the stack consists of banks of final testable HEPA filter located in the exhaust fan/filter addition.

### C.2.3.2 High-Level Radiochemistry Facility

The High-Level Radiochemistry Facility (325A) consists of four primary elements described below.

**C.2.3.2.1 Cell Area.** The 325A east wing contains three interconnecting cells (A-Cell, B-Cell, and C-Cell) and supporting facilities for work with megacuries of radionuclides. These cells are shielded with walls of 1.2-meter (4-feet) thick, high-density concrete on the front and sides and 0.9-meter (3-feet) thick, high-density concrete on the back. The front side contains manipulator ports, service ports, and high-density lead-glass windows having equivalent shielding to that of the walls. The cells are equipped with shielded doors, entry ports and through-the-wall remote Manipulators. Each cell is fully lined with stainless steel and equipped with floor drains that drain to critically safe sump tanks in a shielded basement vault.

In 1978, A-cell and C-Cell were cleaned out, renovated, and re-equipped to process 50 kg/d (110 lb/d) of light-water reactor fuel as part of the Nuclear Waste Vitrification Project (NWVP). The equipment includes dissolvers, feed preparation tanks, a battery of four 4.3-meters (14-feet) pulse columns, a continuous raffinate concentrator, ion-exchange columns for the recovery and purification of plutonium, and supporting tanks and instrumentation. The equipment extracted the fission product waste and transferred it to the 324 Building for conversion to borosilicate glass. The project was shut down in 1980, but no funds were provided for cleanup. Some of the unused equipment still remains. Space has been made in front of each window to conduct other research. Currently, that space is used for the tank sludge characterization program. B-Cell was not used during the NWVP program. It currently contains a core extruder and analytical measuring equipment used for the sludge characterization program.

**C.2.3.2.2 Catalyzed Electrochemical Plutonium Oxide Dissolution.** The catalyzed electrochemical plutonium oxide dissolution (CEPOD) process, which was developed for dissolving plutonium oxide and leaching plutonium contaminated scrap and waste, was installed in room 604 within the east wing. The process is performed in a stainless steel glovebox (2.4-meters high by 1.0-meters wide by 4.1-meters long) (7.9 by 3.3 by 13.4 feet) that has been covered with a 1.27-centimeters (0.5-inches) lead plate for radiation shielding. Two other gloveboxes are located in the north end of Room 604 and are interconnected with a pass-through. The larger of the two is 1.2-meters high by 1.0-meters wide by 1.8-meters long (3.9 by 3.3 by 3.3 feet). Two solution transfer lines, doubly encased of stainless steel, connect the two largest gloveboxes.

C.2.3.2.3 **Cask-Handling Area**. The support area (Room 603) immediately east of Room 604 is used for handling both solution and solid waste casks and moving manipulators between the cells and the repair/storage room.

The truck lock has doors on each end and serves as a ventilation buffer between the cask-handling area and the outside. The truck lock is of sufficient length that a tractor and cask trailer can be totally contained and isolated from the outside. The casks are on- and off-loaded by backing the trailer into the cask-handling area and using the bridge crane. The large solution casks are typically transferred between the cask trailer and the cask transfer station. The cask can be connected with the transfer lines leading to the hot cells, the gloveboxes, or to any of the vault tanks.

C.2.3.2.4 **325A Storage Area for Liquids**. The 325A high-radiation-level storage area for liquids consists of three underground vaults (A-,B-, and C-vaults). The cover blocks over the vaults are 0.9-meters (3-feet) normal concrete on A vault and 1.2-meters (4-feet) normal concrete on B and C vaults. A vault is 13.4 by 4.3 meters (44 by 14 feet), B vault is 7.9 by 4.3 meters (26 by 14 feet), and C vault is 4.3 by 4.3 meters (14 by 14 feet). A vault contains one 68,000 liter (18,000 gallon) stainless steel waste storage tank and one 1,514 liter (400 gallon) transfer tank. B vault contains two 14,800 liter (3,900 gallon) stainless steel tanks. C vault contains one 1,514 liter (400 gallon) and two 1,040 liter (274 gallon) stainless steel tanks. A vault has a stainless steel liner that is 0.9 meters (3 feet) high. B and C vaults have stainless steel liners that are 30.5 centimeters (1 foot) high.

### C.2.3.3 Shielded Analytical Laboratory

The Shielded Analytical Laboratory (325B) west wing contains six interconnecting hot cells. The cells are 1.7 by 1.7 meters (5.5 by 5.5 feet) compartments inside shielding walls. These compartments are divided into three groups of two compartments each, separated by hollow 10.2 centimeters (4 inches) thick sheet metal dividers. The shielding walls on the east and north sides of the cells are 30.5 centimeters (12 inches) of Meehanite iron. Shielding walls on the west and south sides are 66 centimeters (26 inches) of magnetite concrete. The east side of each compartment is equipped with two manipulators and with high-density, lead glass viewing windows. In a separate room (room 202) west of the six interconnecting hot cells are two all-metal cells. One cell is 2 meters (6.5 feet) long by 1.4 meters (4.5 feet) wide by 2.5 meters (8.33 feet) high, inside dimensions, with 15 centimeters (6 inches) thick walls and roof. The other cell (westerly) is 1.7 meters (5.5 feet) long by 1.5 meters (5 feet) wide by 1.5 meters (5 feet) high, inside dimensions, with 15 centimeters (6 inches) thick walls and roof. This cell sits on a pedestal that is 81 centimeters (32 inches) above the floor. Both cells have shielded viewing windows, two master-slave manipulators, an access door, and a pass-through port.

### C.2.3.4 Fissionable Material Storage Room

Room 530 on the first floor near the back of the 325 Building has been designated as a storage area for fissionable material. It contains a rack 1.7 meters (5.7 feet) high and 2.6 meters (8.5 feet wide), having 10 cubicles, each 0.6 meters$^2$ (2 feet$^2$), arranged in a diamond pattern. the rack is made of steel and bolted to the wall. The cubicles have lips and locked, hinged gates to prevent material from falling out.

## C.3 Identification and Screening of Hazards

The hazardous material stored and used at the 325 Building changes as programs are terminated and new programs started. Presently, there is radioactive material in hot cells, gloveboxes, and variety of other containers such as cabinets, waste drums, safes, and drawers. The material is in a variety of forms such as sealed sources, spent fuel segments, powder, liquid, contaminated wipes, etc. Table C.2 summarizes the location of fissionable material in the building on December 30, 1993. An Operational Safety Requirement for the building limits the maximum inventory of radionuclides to the risk equivalent of 170 Ci of plutonium-239. The risk equivalent is the quantity of plutonium-239 that would have the same dose consequences from a seismic event and uncontrolled fire as the given quantity of a radionuclide in a specified form and location. The seismic event/uncontrolled fire is a general emergency (9.7 rem at the site boundary). Therefore, the allowed inventory is sufficient to warrant an emergency plan for the building.

The 325 Building has over a thousand chemicals. Many of these are either common household products such as dish soap or laboratory quantities of common chemicals.

The exclusion of common materials is consistent with 40CFR Part 355.20(3) where the EPA definition of "Hazardous Chemicals" specifically excludes the following:

> "Any substance to the extent it is used for personal, family or household purposes or is present in the same form and concentration as a product packaged for distribution and use by the general public."

The exclusion of laboratory materials is consistent with 40CFR Part 355.20(3), where the EPA definition of "Hazardous chemicals" specifically excludes the following:

> "Any substance to the extent it is used in a research laboratory or a hospital or other medical facility under the direct supervision of a technically qualified individual."

This exclusion applies generally to the 325 Building since there are no large scale demonstration projects that involve potentially hazardous chemicals at this time. All the current research projects that involve chemicals are small scale laboratory operations that are under the direction of a technically qualified researcher. Table C.3 shows the small quantities of individual chemicals that are used in the

**Table C.2. Fissionable Material Location**

| Room | Location | Isotopes |
|---|---|---|
| 55A | Entire room | $^{235}$U(30.7 g), $^{237}$Np(11.6 g), Pu(91.3 g) |
| 305/307 | Gloveboxes, hoods, cabinet | Pu(63.8 g) |
| 406 | Gloveboxes, hoods | $^{235}$U(0.5 g) |
| 504 | Glovebox, hood, waste drum | $^{233}$U(2.3 g), $^{237}$Np(20.6 g), $^{238}$Pu(15.0 g), Pu(125.6 g), $^{241}$Am(0.5 g), $^{243}$Am(8.4 g) |
| 201 | Cells 1,2,3,4,5,6 | $^{233}$U(5.1 g), $^{235}$U(75 g), $^{237}$Np(3.2 g), Pu (116.4 g) |
| 202 | Entire room and shielded cubicles | $^{237}$Np (48.6 g) |
| 506 | Gloveboxes, hoods | Pu(224.1 g) |
| 530 | Storage array | $^{235}$U(160.2 g), Pu(107.4 g) |
| 528 | Drum storage, cabinet | $^{233}$U(12.4 g), $^{235}$U(49.6g), $^{237}$Np(16.7 g), $^{238}$Pu(0.7 g), Pu(315.4 g), $^{241}$Am(0.6 g) |
| 44 | Drum storage | $^{233}$U(0.1 g), $^{235}$U(1.8 g), $^{237}$Np(2.3 g), $^{238}$Pu(0.3 g), Pu(98.0 g), $^{241}$Am(1.3 g), $^{243}$Am(0.5 g), $^{244}$Cm(2.9 g) |
| 46 | Storage cage | $^{238}$Pu(8.8 g), Pu(0.1 g), $^{241}$Am(0.9 g) |
| 48 | Safe | $^{237}$Np(14.9 g), $^{238}$Pu(0.3 g), Pu(3.3 g), $^{241}$Am(2.5 g) |
| 317 | Hoods, cabinet | $^{233}$U(0.2 g), $^{235}$U(2.4 g), $^{237}$Np(0.3 g), Pu(0.7 g) |
| 411 | Cabinet and drawer | $^{233}$U(1.0 g), $^{235}$U(5.8 g), $^{237}$Np(8.7 g), Pu(5.7 g), $^{241}$Am(0.5 g) |
| 516 | Gloveboxes, hoods, special center island | $^{235}$U(115.3 g), $^{237}$Np(1.1 g), Pu(6.6 g) |
| 601 | Cells A,B | $^{235}$U(88.7 g), $^{237}$Np(32.6 g), Pu(75.6 g), $^{241}$Am(24.5 g), $^{243}$Am(7.2 g), $^{244}$Cm(4.6 g) |
| 604 | Gloveboxes, drum storage | Pu(860.7 g), $^{241}$Am(0.1 g) |
| 414 | Cabinet in NW corner | $^{233}$U(0.1 g), $^{235}$U(7.1 g), $^{237}$Np(0.1 g), Pu(0.7 g) |
| 56 | Hood, cabinet drawers | $^{235}$U(148.3 g), $^{237}$Np(1.2 g), $^{241}$Am(0.1 g) |

building. This list was taken from a January 24, 1994, inventory and shows the amount of each chemical that was classed as "Extremely Hazardous" per 40 CFR Part 355. The quantity of each chemical is less than threshold planning quantity (TPQ) specified in the regulation. Two chemical spill scenarios are included in Section C.5 to further demonstrate that chemical spills are not expected to be a problem outside the building.

**Table C.3.** 325 Building Extremely Hazardous Chemicals

| Material | Quantity (lb) | Threshold[a] (lb) |
|---|---|---|
| Ammonia | 19.8 | 500 |
| Bromine | 5.3 | 500 |
| Carbon Disulfide | 5.3 | 10,000 |
| Chloroform | 37.4 | 10,000 |
| Formaldehyde | 6.3 | 500 |
| Hydrofluoric acid | 31.9 | 100 |
| Hydrogen Peroxide | 74.2 | 1000 |
| Mercuric Oxide | 11.1 | 500/10,000 |
| Nitric Acid | 437.8 | 1,000 |
| Nitric Oxide | 13.7 | 100 |
| Phenol | 7.3 | 500/10,000 |
| Sulfuric Acid | 195.1 | 1,000 |
| Titanium Tetrachloride | 9.0 | 100 |
| Vanadium(V) Oxide | 5.5 | 100/10,000 |

(a) TPQ is from 40 CFR pt 355 Appendix A. Extremely hazardous solid substances are subject to either of two TPQs. The lower quantity applies to powder with particle size less than 100 microns or liquid solutions or molten material.

## C.4 Hazard Characterization

The historical at-risk radionuclide inventory in the 325 Building has been larger than those that are currently permitted by the established Operational Safety Requirements. Furthermore, the inventory changes as programs are terminated and new programs started. Therefore, the size and makeup of the inventory cannot be historically defined. The approach that was taken in PNL-7748 was to begin by describing a reference inventory that represents an upper-range historical inventory. After that, reduction factors were applied to the historical inventory to obtain the inventory used in the accident scenario calculations. The several at-risk inventories in the 325 Building include that in the main laboratories, that stored in the basement, that in the CEPOD process area, that in the 325A liquid waste tanks, that in the hot cells, and that held up within the building.

### C.4.1 Main Laboratories

Historically, most of this inventory has been at risk in gloveboxes, drawers, cabinets, hoods, and benches. A relatively small amount of material has been kept in pipe nipples, transport casks, sealed sources, closed safes, and other containers that could withstand crushing and jarring during an earthquake.

To estimate the relative amounts of plutonium and other fissionable materials that were in different physical forms, the PNL safety analysis group surveyed some of the laboratories. The laboratories surveyed were Rooms 302, 305, 306, 307, 308, 317, 406, 410, 411, and 414. The distribution of uranium and plutonium at the time of the survey (1990) is shown in Table C.4.

**Table C.4.** Distribution of Uranium and Plutonium in Main Laboratories

| | Fractions | | |
|---|---|---|---|
| | **Total U** | **$^{235}$U** | **Pu** |
| Not at risk | 0.04 | 0.02 | 0.01 |
| Glovebox | | | |
| Powder | 0.08 | 0.30 | 0.14 |
| Fused or pellets | 0.02 | 0.07 | 0.04 |
| Solution | 0.01 | 0.01 | 0.39 |
| Hood/bench | | | |
| Powder | 0.36 | 0.23 | |
| Pellets | 0.08 | 0.04 | |
| Solution | 0.02 | 0.02 | 0.01 |
| Drawer/cabinet | | | |
| Powder | 0.31 | 0.23 | 0.24 |
| Pellets | 0.08 | 0.08 | 0.07 |
| Solution | | | 0.01 |

#### C.4.1.1 Inventory

The inventory changes as programs are completed and new programs started. Table C.5 compares the present inventory of fissionable material with the January 30, 1990 inventory.

These inventories, which were derived from accountable materials inventories, are not a complete description of the plutonium isotopic breakdown. Therefore, to approximate the building plutonium inventory, the isotopic breakdown for the Fast Flux Test facility mix was used (Table C.6.). PNL-7748 concluded that this mix was representative of the plutonium in the building in 1990.

The source term for the earthquake was derived by applying the distribution in Table C.4 and the isotopic mix in Table C.6 to the entire 2000 grams of plutonium permitted in the main building.

**Table C.5.** Total 325 Building Fissionable Material Inventory

| Nuclide/Material | Jan. 30, 1990 | Dec. 27, 1993 |
|---|---|---|
| $^{238}U$ | 168.4 kg | 40.1 kg |
| $^{233}U$ | 22.2 g | 26.3 g |
| $^{235}U$ | 1.33 kg | 0.63 kg |
| $^{237}Np$ | 150.7 g | 164.8 g |
| Total Pu (All Isotopes) | 3276 g | 1957.6 g |
| $^{238}Pu$ | 14.9 g | 25.4 g |
| $^{241}Am$ | 33.7 g | 31.1 g |
| $^{242}Pu$ | 0.7 g | 1.1 g |
| $^{243}Am$ | 16.1 g | 16.1 g |
| $^{244}Cm$ | 5.8 g | 7.5 g |

**Table C.6.** Pu Isotopic Mix

| Isotope | Weight Fraction |
|---|---|
| Pu-238 | 0.00048 |
| Pu-239 | 0.86613 |
| Pu-240 | 0.1196 |
| Pu-241 | 0.0122 |
| Am-241 | 0.00136 |
| Pu-242 | 0.00180 |

### C.4.1.2 Properties of Plutonium

Since its discovery in the winter of 1940-1941, plutonium has been extensively studied and is one of the most characterized chemical elements. Many references are available on the nuclear and chemical properties. The following brief summary was taken from the DOE Health Physics Manual of Good Practices for Plutonium Facilities(DOE 1988).

Plutonium is a silvery-white metal, much like nickel in appearance. In moist air or moist argon, the metal rapidly oxidizes producing a mixture of oxides and hydrides. If exposed long enough, an olive-green powdery surface coating of $PuO_2$ is formed. With this coating the metal is pyrophoric.

Plutonium metal has a low melting point (640° C) and an unusually high boiling point (3327° C). At room temperature, plutonium exists in the alpha phase with a density of about 19.86 g/cm$^3$. Heating that is caused by high specific activity or machining operations can cause large changes in volume.

At room temperature, the most stable oxide is $PuO_2$. Loose $PuO_2$ powder usually has a density of about 2 grams/centimeters$^3$. If the oxide is pressed and sintered into pellets, it may have a density of 10.3 to 11.0 grams/centimeters$^3$.

The chemistry of plutonium is complex and many different chemical species often coexist. Plutonium is the fifth element in the actinide series, which consists of elements with properties that stem from partial vacancies in the 5f electron shell. In general, there are four oxidation states: (III), (IV), (V), and (VI). The complicated chemistry of plutonium is discussed in detail in Section III of Volume I of the Plutonium Handbook: A Guide to the Technology (Wick 1967) and in Plutonium (Tauble 1964).

The problems of oxidation of metallic plutonium during storage were recognized shortly after the discovery of plutonium. Massive (i.e., not finely divided) plutonium is relatively inert in dry air and is comparatively easy to handle and store for a few days. Special precautions must be taken when storing metallic plutonium for longer periods of time.

The health physics aspects of an accidental plutonium fire can be serious. A fire can burn through containment structures, resulting in the dispersal of $PuO_2$ over a wide area and the potential for inhalation exposure during the fire or during subsequent decontamination efforts. Plutonium, some plutonium alloys, and some plutonium compounds are pyrophoric. Finely divided plutonium, such as turnings or powder, are definitely pyrophoric and must be handled with care. Certain solvents and organic compounds form flammable mixtures with plutonium. Chlorinated solvents have been involved in several fires with plutonium and its alloys.

Pyrophoric products may be formed on plutonium and certain alloys if they are stored for long times in closed containers. When a container is opened, spontaneous ignition may occur, which can result in the destruction of the container, damage to the glovebox, and spread of finely divided or particulate oxides throughout the glovebox and its ventilation system.

The primary emergency preparedness concern with plutonium is entry into the body from inhalation. The distribution pattern of inhaled material within the lung is related to the activity median aerodynamic diameter (AMAD) of the aerosol provided that the particle sizes of the particulates follow a log-normal distribution (International Commission on Radiological Protection (ICRP) 1979). The ICRP (1979) has published a mathematical model for estimating the distribution of an aerosol in the respiratory system based on the AMAD. The AMAD for a particular aerosol may be estimated (e.g., Knutson and Lioy 1983), although it is common to assume an AMAD of 1 μm.

The length of time that an aerosol will be expected to remain in the lung following inhalation is based on its solubility class. There are three solubility classes described by the ICRP in their Publication 30 (ICRP 1979): D (day), W (week) and Y (year); the times listed indicate the order of magnitude of the half-life of the material in the lung. The biological half-lives for D, W, and Y materials in the lung are 0.5, 50, and 500 days respectively. The actual solubility class can be estimated by measurement of the materials solubility in simulated lung material or by using the solubility class determined by the ICRP for various chemical compounds (see Table C.7).

**Table C.7.** Solubility Classes of Plutonium Compounds

| Compound | Solubility Class |
|---|---|
| None | D |
| All except oxide | W |
| Oxide | Y |

## C.4.2 Basement Storage

Westinghouse Hanford Company (WHC) stored uranium and thorium in the basement of the 325 Building for several years. This material has been removed.

## C.4.3 CEPOD Process Area

The CEPOD process was designed to make up to 14 runs per year. At the end of each run is a period during which the entire plutonium oxide output of the run was contained in the process gloveboxes as powder and was at risk. Thus, the worst-case historical inventory was the 2000 grams of plutonium permitted to the process by PNNL's safeguards group, and the worst-case form was plutonium oxide powder.

### C.4.3.1 Inventory

The CEPOD process in not active but approximately 859 grams of plutonium remain in the gloveboxes and drum storage. This includes 48.3 grams of Material Unaccounted For (MUF) in glovebox 36 which is assumed to be holdup.

### C.4.3.2 Properties

The material is in several forms including ash, paste and oxide. The properties of plutonium are briefly described above.

### C.4.3.3 Conditions of Storage and Use

Most of the inventory, 606.8 grams, is in three type 6M drums. The remainder is in gloveboxes #36 and #38. All of the glovebox inventory is in process vessels, cans and holdup. The CEPOD process in room 604 is not active at this time.

### C.4.4 Liquid Waste Tanks

The exact inventory of radionuclides in the liquids stored in the 325A tanks varies from project to project. However, concentrations are generally quite low. Each of the three vaults in the 325A high-level liquid storage area has a criticality-based limit of 230 g plutonium, or a total of 690 g plutonium for the seven storage tanks(total volume of which is 102,700 L).

### C.4.5 Hot Cells

The maximum historical inventory for the 325A hot cells resulted from handling large quantities of spent fuel. Under those circumstances, the most significant radionuclides present, from a dose standpoint, would be 265 Ci of krypton-85 and 1.7 Ci of tritium. No operations of this magnitude are currently under way or approved. The historical inventory is the bounding inventory because of its size and its immediate releasability.

### C.4.6 Holdup

There are few measurements of plutonium holdup as surface contamination, or non-testable filter contents. One set of measurements in 1989 showed that of five glovebox holdup measurements, the maximum value was 14.5 g plutonium. Another glovebox holdup measurement in 1990 showed holdup of 0.83 g plutonium. This included smearable, nonsmearable, and filter contamination. PNL-7748 estimated that the total building holdup including gloveboxes, ducts, and primary and secondary filters is 380 g of plutonium with the FFTF plutonium isotopic mix.

## C.5 Event Scenarios

PNL-7748 identified various scenarios that could breach the barriers that maintain control over each of the hazardous materials discussed in the previous section. The paragraphs below determine the emergency category of various scenarios using the consequences reported in PNL-7748 and the criteria listed in Tables C.8 and C.9.

**Table C.8.** Radiological Release Criteria

| Emergency Category | Criteria[(a)] |
|---|---|
| Alert | > 100 mrem committed dose equivalent at facility boundary |
| Site Area | ≥ 1 rem committed dose equivalent at facility boundary |
| General | > 1 rem committed dose equivalent at site boundary |
| (a) The criteria apply to a peak concentration of the substance in air. If ERPG values have not been established for a substance, alternative criteria specified in the Emergency Management Guide for Hazards Assessments shall be used. | |

**Table C.9.** Non-Radiological Release Criteria

| Emergency Category | Criteria[a] |
|---|---|
| Alert | > ERPG 1 at facility boundary |
| Site Area | ≥ ERPG 2 at facility boundary |
| General | ≥ ERPG 2 at site boundary |
| (a) The criteria apply to a peak concentration of the substance in air. If ERPG values have not been established for a substance, alternative criteria specified in the Emergency Management Guide for Hazards Assessments shall be used. | |

There are general criteria for emergency classification in addition to the numerical values in the tables above. The threshold between reportable occurrences and the Alert classification is difficult to establish based solely on a numerical value. The following general criteria apply in addition to the airborne release concentration values specified in Tables C.8 and C.9 above.

- **Alert** – An Alert Level Emergency shall be declared when events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the facility with an increased potential for a release.

  In general, the Alert classification is appropriate when the severity and/or complexity of an event may exceed the capabilities of the normal operating organization to adequately manage the event and its consequences.

- **Site Area** – A Site Area Emergency shall be declared when events are in progress or have occurred which involve actual or likely major failures of facility functions needed for protection of workers and the public.

- **General** – A General Emergency shall be declared when events are in progress or have occurred that involve actual or imminent catastrophic failure of facility safety systems with a potential for loss of confinement or containment integrity.

There is additional emergency classification guidance in the Emergency Management Guide on Event Classification and Emergency Action Levels (EALs). The Hazards Assessment in the following sections is based primarily on a comparison of calculated consequences with the numerical criteria in the tables above. However, some recommendations are provided based on the more General Emergency classification criteria.

### C.5.1 Facility Emergency Events

All significant quantities of radioactive materials are handled inside gloveboxes and Hot Cells. The paragraphs below briefly describe possible containment barrier failure modes.

### C.5.1.1 Gloveboxes

C.5.1.1.1 **Failure of Primary Barrier.** The primary barrier for gloveboxes are the walls, gloves, ports and ventilation openings. A loss of glovebox confinement could be caused by one of the following:

1. **Torn or ripped off glove** – While the potential for this type of accident is relatively high, the consequences are low. Gloveboxes operate at a pressure that is negative compared to the room. A glove breach will cause little spread of contamination as air will be drawn into the box.

2. **Glovebox overpressurization** – Compressed air is supplied to those gloveboxes requiring dry air atmospheres. These gloveboxes have been equipped with individual over-pressurization control systems. The consequences of an overpressurization could be a breach of the box integrity and release of a portion of the glovebox contents to the adjacent laboratory.

3. **Fires** – Glovebox fires can result in loss of confinement in the glovebox and local contamination of the adjacent laboratory. Administrative controls provide some control of solvents and flammable materials. The exhaust system will work to maintain the glovebox at a negative pressure, which would reduce the spread of contamination. Gloveboxes that take air from the room could, if overpressurized by an energy release such as a fire, expel radioactive material into the room through the air intake. Intake HEPA filters are provided against this eventuality. However, the filters are not testable in place.

4. **Explosions in gloveboxes** – These have occurred in various facilities. In this type of event, contamination could spread to the corridor and adjacent laboratories before the exhaust system could control the event.

### C.5.1.2 Hot Cells

C.5.1.2.1 **Failure of Primary Barrier.** The primary barrier for hot cells are the walls, windows, manipulator boots, ports and ventilation openings. The loss of hot cell confinement could be caused by one of the following:

1. **Leaking manipulator boot or unsecured port** – The consequences for this type of accident depend upon the size of the leak relative to ventilation air flow. The confinement system is based on maintaining a negative air pressure in the cell relative to the adjacent laboratory. Alarms are provided to warn of a loss of cell pressure differential. Even during an air pressure differential loss, it would be unlikely that a spread of contamination of any significance would occur in the

absence of air currents within the cells to expel contamination. The primary concern for an unsecured port or missing plug is radiation streaming.

2. **Loss of Hot Cell Ventilation** – An electrical power failure, failure of ventilation fans, or faulty ventilation damper alignment could cause a loss of air pressure differential. Various alarms are provided to warn of these conditions. All operations in the cells would be curtailed and sources of contamination secured until the ventilation system is returned to normal.

3. **Fires** – Hot cell fires have occurred in several facilities and can result in loss of confinement by disrupting the ventilation system and providing air currents to move the material. Exhaust filters can be plugged with smoke causing either reverse air currents out the inlet openings or failure of the filter because of high differential pressure. In extreme cases, flame or burning embers can ignite an exhaust filter. The chance of loss of both stages of HEPA filtration is very small because of the physical separation.

4. **Explosions in Hot Cells** – These have occurred in various facilities. If the explosion breaches containment, contamination could spread to the corridor and adjacent laboratories before the exhaust system could control the event.

5. **Loss of HEPA filtration** – The ventilation and filter systems provide the principal engineered features for contamination control within the building. HEPA filter damage could result from maintenance, construction, overloading, age or manufacturing defect. The probability of undetected failure of the HEPA filters is reduced by annual and post-installation inspection and testing. The loss of the primary testable HEPA filter on the hot cells, gloveboxes, and fume hoods is unlikely in the event of explosions, fires and other events because protection is provided by the non-testable HEPA filter at the point of origin and by several right angels in the exhaust duct upstream of the primary HEPA filter.

- **Effects of Other Barriers** – The building structure and ventilation system provide a secondary barrier to a release from a glovebox, hot cell or fume hood. The building is not designed as a containment structure. Therefore, some leakage is possible around or through doors, windows and building penetrations. However, the building ventilation system is designed and operated to assure safe confinement of radioactive materials under normal and likely failure modes. Cascading pressure levels are used to maintain proper air flow balance and direction. The main exhaust air system for the building consists of four exhaust fans, primary and final testable stages of HEPA filters, an exhaust plenum, connecting ductwork, and a 16.8 m (55 ft) high stack. An intact and operating exhaust system would reduce a particulate release by a factor of at least 105.

- **Range of Possible Releases** – Common problems such as torn gloves in a glovebox are not an emergency preparedness concern since potential releases from the building are far below the level

that would create an Alert emergency. Several major failures of material confinement are analyzed below. They include the bounding glovebox and hot cell fires, glovebox and hot cell explosions and loss of electrical power. These events cover a range of possible releases from non-emergencies to a Site Area emergency. Events such as large fires that involve more than one room have the potential to reach a General emergency as described below.

### C.5.1.3 Facility Fire

PNL-7748 analyzed four fire scenarios. They range in severity from a glovebox fire to a post-seismic uncontrolled building fire. These scenarios and their consequences are reviewed below to provide insight on establishing the emergency classification of 325 Building fires.

#### C.5.1.3.1 Hot Cell Fire

This scenario is the bounding Hot Cell fire. In this scenario, waste materials from the Nuclear Waste Vitrification Program (NWVP) inside the "A" hot cell, including rags soaked with organic solvent, are ignited by spontaneous heating. The scenario further assumes that the initial fire causes failure of the connections on a solvent extraction scrub column. The organic solvent is ejected, causing failure of the floor-level exhaust column. Flame propagation along the exhaust duct surfaces causes loss of both the primary and secondary HEPA filters, together with any charcoal filter that may be in place. The final filter bank is assumed to remain intact. This scenario is from a program that is no longer active in the cell. However, it represents the bounding case since current and projected inventories of combustibles and radionuclides are believed to pose lower consequences.

The hot cell inventory was selected as a bounding case, although the Nuclear Waste Vitrification Program (NWVP) under which the inventory was provided is no longer in existence. The bounding nature of the inventory arises from its being dissolved in combustible solvent and its high quantity of highly radiotoxic Pu radionuclides. Current and projected inventories of combustibles and radionuclides are believed to pose lower consequences.

There were 25 liters of solvent present in the three columns and two organic headpots for the NWVP. It is assumed that all of the solvent was ejected when the heat and flames from the spontaneous trash fire caused column connections to fail. Of the solvent release, 10% (or 2.5 liters) was assumed to cover various surfaces in the cell and to be burned in the fire with the remainder going into the drain. A release fraction of 11.4% (Ayer et al. 1988) was used for the uranium and plutonium dissolved in a combustible liquid. The iodine has a release fraction of 84.3%. The respirable fraction is 66% (Mishima 1973). The floor level in cell filters are assumed to be splashed by the burning liquid and rendered nonfunctional. Incomplete combustion is assumed to permit flame propagation to the primary HEPA filters causing loss of both of these filter banks. Because the final filters are located in a separate building, the final filters are assumed to survive. A release fraction of 0.001 (99.9% efficiency) is attributed to these filters. The charcoal filters are not currently in place, but would be if work involving iodine radioisotopes were under way. It is assumed that the charcoal filters are exposed to combustion and they fail. Table C.10 summarizes the source term for this event.

**Table C.10.** Hot Cell Fire Source Term

| Nuclide | Solvent Conc. (Ci/L) | Solvent Released (L) | Release Fraction | Respirable Fraction | Filter Factor | Source (Ci) |
|---|---|---|---|---|---|---|
| $^{129}I$ | 1.5E-07 | 2.5 | 0.843 | 1 | 1 | 3.16E-07 |
| $^{234}U$ | 6.0E-05 | 2.5 | 0.114 | 0.66 | 0.001 | 1.13E-08 |
| $^{235}U$ | 1.3E-06 | 2.5 | 0.114 | 0.66 | 0.001 | 2.45E-10 |
| $^{236}U$ | 2.3E-05 | 2.5 | 0.114 | 0.66 | 0.001 | 4.33E-09 |
| $^{237}U$ | 1.9E-04 | 2.5 | 0.114 | 0.66 | 0.001 | 3.57E-08 |
| $^{238}U$ | 2.5E-05 | 2.5 | 0.114 | 0.66 | 0.001 | 4.70E-09 |
| $^{238}Pu$ | 2.2E-01 | 2.5 | 0.114 | 0.66 | 0.001 | 4.14E-05 |
| $^{239}Pu$ | 2.5E-02 | 2.5 | 0.114 | 0.66 | 0.001 | 4.70E-06 |
| $^{240}Pu$ | 3.7E-02 | 2.5 | 0.114 | 0.66 | 0.001 | 6.96E-06 |
| $^{241}Pu$ | 7.8E+00 | 2.5 | 0.114 | 0.66 | 0.001 | 1.47E-03 |
| $^{242}Pu$ | 1.1E-04 | 2.5 | 0.114 | 0.66 | 0.001 | 2.07E-08 |

All plutonium is assumed to be converted to oxide by the fire: hence lung clearance class Y is used in the dose calculation. The release was modeled as a ground level release with a 600 $m^2$ building wake factor. The calculated dose given in PNL-7748 is 15 mrem at the facility boundary and 1.5 mrem at the site boundary. These doses are well below the criteria for an "Alert" emergency.

This scenario models a hot cell fire and shows that significant consequences are not expected outside the facility if the release is filtered through at least one bank of HEPA filters.

The scenario, however, demonstrates the difficulty of classifying events solely on the basis of the calculated consequences. Other more general criteria also apply. The scenario assumes that two of the three HEPA filter banks breach leaving only one bank intact to prevent a release. The final bank would be challenged by the smoke from the fire. Based on the barrier approach outlined in the Emergency

Management Guide for Event Classification and EALs, this scenario would be classified at the highest emergency class possible for the available inventory and release mode since two of the barriers have failed and the third is challenged. The highest emergency class possible is a General Emergency since the site boundary dose from the release would be approximately a factor of 1000 higher, or 1.5 rem, if the final HEPA filter failed.

Hot Cell fires in the 325 Building are expected to range from non-emergencies to General emergencies depending upon the severity of the fire, inventory at risk in the hot cell and the condition of the cell ventilation system.

#### C.5.1.3.2 Consuming Glovebox Fire

The bounding glovebox fire scenario is a fire in a glovebox containing plutonium oxide powder. A solvent vapor in the glovebox is postulated to ignite causing an explosion and fire. The fire continues until the gloves and the combustible glovebox windows are consumed. The fire is then rapidly controlled. A portion of the plutonium oxide powder becomes airborne through the explosion and through burning as contamination of combustible liquids and solids. Additional plutonium is carried away by the water used to fight the fire. A small fraction of this plutonium reaches the pavement and soil outside the building through doors left open to accommodate fire hoses. A fraction of the plutonium carried outside by the water is resuspended by the wind.

The source term was based on as assumed inventory of 230 g of $PuO_2$ in a can inside the glovebox and 14.5 g of $PuO_2$ holdup in the glovebox. The overall combined release/respirable fraction is about 0.00016 to the air outside the building. Section B.4 in PNL-7748 provides the details of release fraction calculations. The material is assumed to be powder for FFTF fuel. The activity release is shown in Table C.11.

**Table C.11.** Source Term for Consuming Glovebox Fire

| Nuclide | Ci |
|---|---|
| $^{238}Pu$ | 0.00032 |
| $^{239}Pu$ | 0.00202 |
| $^{240}Pu$ | 0.0010 |
| $^{241}Pu$ | 0.05110 |
| $^{241}Am$ | 0.00017 |
| $^{242}Pu$ | 2.7E-07 |

This scenario represents a worst case combination of circumstances that bound a single glovebox fire. The release was modeled as a ground level release with a 600 m2 building wake calculation. The calculated dose of 630 mrem at the facility boundary places this scenario in the Alert category. Smaller fires that do not challenge the glovebox and ventilation integrity would not be emergency events.

#### C.5.1.3.3 Fire During Sprinkler Outage

Two possible situations could lead to a fire that spreads from one room to another. The first is a fire during maintenance on the sprinkler system. The second is a fire following a seismic event that disrupts both the sprinkler and building ventilation systems. The combined ventilation/sprinkler outage has more severe consequences.

In this scenario, two adjacent rooms are involved in a fire following disruption of the sprinkler and building ventilation systems. A glovebox containing 230 g of dispersible plutonium is substantially

destroyed in each room by the fire. Each glovebox is equivalent in radiological and combustible inventory to the one postulated in the consuming glovebox fire. Because of the loss of ventilation postulated in this event, the building release fraction is 0.25 compared to about 0.02 for the consuming glovebox fire. The nuclides released to the air outside the building (source term) are shown in Table C.12. The calculated dose from the fire is 14.8 rem at the facility boundary and 2 rem at the site boundary. These results place this scenario in the General Emergency category.

**Table C.12.** Source Term for Sprinkler Outage Fire

| Nuclide | Ci |
|---|---|
| Pu-238 | 0.00772 |
| Pu-239 | 0.0488 |
| Pu-240 | 0.0248 |
| Pu-241 | 1.234 |
| Am-241 | 0.00406 |
| Pu-242 | 6.4E-06 |

#### C.5.1.3.4 Post-Seismic Uncontrolled Fire

The post-seismic fire is the bounding analyzed event in PNL-7748. The scenario is initiated by an earthquake with a peak horizontal acceleration of 0.135 grams, which has an annual frequency of 1 in 5000 years. The basic building structure survives the event but the ventilation and sprinkler systems are damaged. Release paths are created by broken windows and doors jammed in a partially open position. A fire starts that the Hanford Fire Department is unable to control because of confusion caused by the earthquake, damage to fire fighting equipment, hazards to fire fighters or assignment to higher priority fires. Early in the fire, a deflagration that breaches the building wall or roof is assumed to occur. The explosive material is a room-sized cloud of flammable gas or vapor. The cloud is assumed to accumulate in a room because of the failure of the HVAC system. The explosion not only breaches the building but damages and spreads hot gases over much of the inside of the building, leading to the spread of the fire throughout the building.

All of the material in the main laboratories, whether in gloveboxes, drawers, cabinets, hoods, or benches, is assumed to be at risk from fire and/or heating, except for the small amount kept in pipe nipples, closed safes, and other containers that could withstand both the earthquake and the fire. Only one-third of the material is considered to be subject to the blast effects of the explosion.

The inventory from the CEPOD process is not considered to be at risk from explosion, since it is separated by a wall from the main building where solvents and flammable gases are used and since such flammables are not used in the area. There is a release, however, due to the fire and the earthquake.

It is conservatively assumed that the contents of all the tanks in the 325 Building vault spill into the vault. The inventory is not considered to be at risk from fire or explosion because of the lack of

combustibles. The limit on the amount of material release is the amount of waste solution fog that can be suspended in the volume of stagnant air in the vault.

Both the 325A and 325B hot cells would remain undamaged by the postulated seismic event. However, the exhaust ducting may be sheared off in the basement and the primary filters damaged. The hot cell atmosphere is assumed to leak through the sheared ducts and be partially released through openings in the building walls. The hot cells are not considered to be at risk from the fire.

The holdup in the 325 Building is in the form of dust and plated-out material in the gloveboxes, plated-out material in the exhaust ducts, and the contents of the non-testable glovebox and cell filters and the downstream testable filters. This scenario assumes 14.5 g of plutonium in each of 26 gloveboxes. The plutonium is assumed to be divided between the inside of the glovebox walls (10.5 grams) and the glovebox non-testable filter (4 grams). If the glovebox walls are combustible, the holdup on the walls is assumed to burn. If not, the holdup is subject only to resuspension.

The activity released during the first two hours following a seismic event and uncontrolled fire is shown in Table C.13.

**Table C.13.** Source Term for Post-Seismic Uncontrolled Fire

| Nuclide | Ci |
|---|---|
| $^{3}H$ | 0.0425 |
| $^{85}Kr$ | 66.2 |
| $^{232}Th$ | 9.95E-7 |
| $^{238}U$ | 2.73E-5 |
| $^{235}U$ | 1.20E-6 |
| $^{233}U$ | 6.63E-5 |
| $^{237}Np$ | 3.35E-5 |
| $^{238}Pu$ | 0.112519 |
| $^{239}Pu$ | 0.190783 |
| $^{240}Pu$ | 0.096653 |
| $^{241}Pu$ | 4.82295 |
| $^{241}Am$ | 0.050242 |
| $^{242}Pu$ | 2.61-05 |
| $^{243}Am$ | 0.001015 |
| $^{244}Cm$ | 0.152243 |

The calculated dose is 94 rem at the facility boundary and 9.7 rem at the site boundary. This event would be a General Emergency.

The 325 Building contains a large number of chemicals in small quantities. The main danger in a large fire is potentially high concentrations in local areas within the building. The building would be evacuated in these circumstances limiting the exposure to individuals. No significant impact from chemical exposure is expected outside the building.

#### C.5.1.3.5 Conclusion for 325 Building Fires

The Guidance Document for Hazards Assessments specifies that a broad range of events should be considered. The scenarios described above demonstrate the wide range of possible consequences from 325 Building fires. Small fires such as smoldering rags in a hot cell would not require activation of the emergency response centers. The building operations organization and the Hanford Fire Department would likely extinguish the fire with no release of hazardous materials outside the building. Conversely, a building-wide uncontrolled fire would be a General Emergency since there is a substantial amount of hazardous material in the building and the building is located near the Hanford Site boundary. The paragraphs below describe the expected range of severity for glovebox, hot cell, and building fires.

Fires in a single Glovebox are expected to range from non-emergencies to Alert emergencies depending upon the severity of the fire, material in the box and the potential for an unfiltered release path. Fires that involve more than one glovebox could release enough material to cause a General Emergency.

Fires in a single hot cell are expected to range from non-emergencies to General emergencies. The key determining factors are the inventory in the cell, severity of the fire and the condition of the cell ventilation/cell containment systems.

The emergency classification of building fires range from non-emergencies to General emergencies. For example, a waste basket fire in an office area would not be an "emergency" condition. Conversely, large fires that involve hazardous materials can create a General Emergency condition. The main factors that determine the emergency classification are the fire severity and duration, proximity of the fire to hazardous materials and, damage to confinement and containment barriers.

### C.5.1.4 Facility Explosion

Two glovebox explosion scenarios and one building breach explosion scenario are described below. The glovebox scenarios are similar in that they postulate that an explosion breaches a glovebox but the plutonium made airborne from the events passes through two stages of HEPA filters before release from the building. The two scenarios differ in the magnitude of the source term and the postulated cause of the explosion. Both glovebox explosion scenarios are reviewed in Section C.5.1.4.1 below. The building breach event is postulated to occur from the buildup of an explosive vapor or gas mixture inside a room containing 230 grams of plutonium. This scenario has worse consequences than the glovebox explosions since the building is breached. The building breach explosion is described in Section C.5.1.4.2 below.

C.5.1.4.1 **Glovebox Explosions**. The first glovebox explosion scenario is an explosion in an ion-exchange column inside a glovebox. Ion-exchange columns are used in the 325 Building to separate plutonium from other impurities in solutions. Resins used in the past in these types of columns have been involved in explosions under conditions in which the resins were exposed to high nitric acid concentrations, elevated temperatures, and drying or oxidation of the resin. As a result of the explosion, the column is assumed to break with enough energy to breach the glovebox window. Hot liquid and resin spray into the room and throughout the interior of the glovebox.

The plutonium nitrate solution contains 100 grams/liter. For an energy level similar to that expected in this scenario, an aerosol concentration of 1.6 milliliter/meter$^3$ was achieved in flashing spray experiments. The glovebox is about 10 meters$^3$ in volume. Thus 16 milliliters of solution are assumed to be suspended in the glovebox from the accident with 62% in the respirable size range. Approximately 26% of this amount escapes to the room via the broken glovebox window. In addition, 0.25 grams of solution are resuspended from the remaining solution spilled onto the floor of the glovebox over the 2 hours following the explosion. The plutonium made airborne from the event passes through two stages of HEPA filter assumed to be 99.9% and 99.8% efficient. The release from the building is 2.4E-06 grams of Pu. The calculated facility boundary dose is $4 \times 10^{-5}$ rem.

The second glovebox explosion scenario involves the CEPOD process. Hydrogen generation is postulated to occur by the electrolysis of water at the cathode. The 15-centimeters by 1.2-meters glass reaction vessel in the off gas scrubber system fills with a mixture of hydrogen and air and the mixture is ignited. The explosion shatters the reaction vessel and destroys a glovebox window or glove, causing liquid to be blown out into the room. Two HEPA filters at 99.9% and 99.8% reduce the atmospheric release to $4.5 \times 10^{-6}$ grams plutonium. The calculated dose at the facility boundary is $7.1 \times 10^{-5}$ rem.

These two scenarios are similar in that the calculated dose outside the building for both postulated events is well below the criteria for an Alert emergency. However, a glovebox explosion could injure and contaminate workers inside the facility. Emergency classification would depend upon the number of people injured and contaminated and the extent of outside assistance required to control the event.

In general, the Alert classification is appropriate when the severity and/or complexity of an event may exceed the capabilities of the normal operating organization to adequately manage the event and its consequences.

C.5.1.4.2 **Building Breach Explosion**. The 325 Building contains a number of potential explosives including gas cylinders and volatile flammable solvents. An explosion equivalent to 1.8 kilograms of TNT is postulated to occur from the accumulation of flammable gas or vapor from a leak. The explosion buckles the metal siding in the exterior building wall and blows 14% of the plutonium oxide located near the wall through the hole. The source term is derived starting with 230 g of Pu, 10% of which is in the respirable size range. Fifteen per cent is airborne from the explosion. The material is assumed to be plutonium for FFTF fuel. The activity release from the building is summarized in Table C.14 below.

The calculated dose is 11 rem at the facility boundary and 1.1 rem at the site boundary. These results place this scenario in the General Emergency category.

**Table C.14**. Source Term for Building Breach Explosion

| Nuclide | Ci |
|---|---|
| $^{238}Pu$ | 0.004161 |
| $^{239}Pu$ | 0.026298 |
| $^{240}Pu$ | 0.013323 |
| $^{241}Pu$ | 0.664806 |
| $^{241}Am$ | 0.002183 |
| $^{242}Pu$ | 3.48E-06 |

### C.5.1.5 Loss of Containment/Confinement

Containment is defined in PNL-7748 as a region designed to meet code requirements for containment and that is leak tested. Examples include liquid waste tanks and shipping casks. The PNL-7748 loss-of-containment accident that involves radiological material is a spill from a liquid waste cask. Chemical loss of containment accidents are described in the Hazardous Material Release section of this document.

Confinement is an area in which the spread of contamination is reduced or eliminated by the use of engineered barriers and controlled airflow to minimize leakage. The gloveboxes, hot cells, and fume hoods are examples of confinement regions. The PNL-7748 loss of confinement events included a loss of ventilation caused by a complete power failure and a breach of a primary filter. The loss of containment and loss of confinement scenarios are described below.

C.5.1.5.1 **Liquid Waste Cask Accident**. Liquid wastes can be transferred to the cask-handling station east of the 325A hot cells from the hot cells, gloveboxes, or any of the vault tanks. The casks are moved into and out of the station by an overhead bridge crane. This scenario postulates the spill of 550 gallons of liquid waste during cask loading. Actual spills would likely be smaller since there are many administrative and engineering

barriers to the release of contaminated liquid. For example, the transfers are accomplished by vacuum so there is little or no driving force to cause a spill if a line were to break or become disconnected.

The source term is derived assuming a bowling-ball cask that contains 550 gallons of liquid waste spills. Wastes with many different isotopic compositions have passed through the cask handling station. Two types of wastes were considered in PNL-7748. The one that gave the highest consequences was waste from the NWVP program. The isotopic concentration for this waste stream was:

- Pu-238 0.00029 Ci/L with a total inventory in the spill of 0.6037 Ci
- Pu-239 3.2E-05 Ci/L with a total inventory in the spill of 0.0666 Ci
- Pu-240 4.8E-05 Ci/L with a total inventory in the spill of 0.0999 Ci
- Pu-241 0.0097 Ci/L with a total inventory in the spill of 20.19 Ci
- Pu-242 1.4E-07 Ci/L with a total inventory in the spill of 2.91E-04 Ci

The maximum spill height is about 8 feet, the approximate height of the top of a cask when in the station. The airborne release fraction from the falling liquid is 2.4E-05. Additional material is resuspended over the next two hours. The total release fraction including the spill and resuspension for the first two hours is 1.5E-04. The airborne material must pass through two stages of HEPA filtration with a total reduction factor of 2E-06. Table C.15 below summarizes the activity released from the building in the first two hours following the spill.

The calculated dose at the facility boundary is $6.2 \times 10^{-8}$ rem which is well below the Alert dose criteria. The calculation takes credit for both the primary and exhaust HEPA filters and therefore does not apply to a cask spill outside the facility. The dose would be a factor of 2E+06 higher outside the building or 120 mrem. A spill outside the building would be an Alert level emergency.

**Table C.15.** Source Term for Liquid Waste Cask Spill

| Nuclide | Ci |
|---|---|
| $^{238}Pu$ | 1.77E-10 |
| $^{239}Pu$ | 1.95E-11 |
| $^{240}Pu$ | 2.93E-11 |
| $^{241}Pu$ | 5.91E-09 |
| $^{242}Pu$ | 8.53E-14 |

C.5.1.5.2 **Complete Loss of Electrical Power.** Confinement of material within the 325 Building hot cells and gloveboxes depends, in part, upon maintaining a negative pressure in the cell/box relative to the gallery or laboratory. The negative cell pressure causes air flow into the cell through openings in the cell wall. Air is exhausted out of the cell through a ventilation system that includes three stages of HEPA filters. Loss of ventilation can result in reverse air currents out the inlet openings and into the gallery. From there, hazardous material can be released from the building through gaps under closed doors and other similar openings. The building is not designed to be a leak tight containment structure.

The bounding loss-of-confinement accident results from a loss of building ventilation caused by a complete loss of electrical power. The event is postulated to occur during the process of dissolving spent nuclear fuel in a hot cell. Furthermore, the ventilation loss is postulated to result in solvent vapor concentration in a glovebox containing plutonium. The vapor explodes releasing more material. The source term for this release is shown in Table C.16. Details of the source calculation may be found in Appendix B, Section B.7 of PNL-7748.

The calculated dose at the facility boundary is 4.0 rem. The site boundary dose is 0.42 rem. These results place this postulated release in the Site Area emergency category.

The hot cell source term for this scenario was derived from a program that is not currently active in the 325 Building, the NWVP. This source was selected since it includes a large inventory of gaseous fission products which could be released if ventilation is lost. Liquid or solid material would normally not be released immediately following a ventilation loss unless some other condition such as air currents from a fire existed to move significant quantities of the material out of the cell. Loss of hot cell and/or glovebox ventilation would range from a non-emergency to a Site Area

**Table C.16.** Source Term for Loss of Electrical Power

| Nuclide | Ci |
|---|---|
| $^{3}H$ | 0.017 |
| $^{85}Kr$ | 2.65 |
| $^{238}Pu$ | 2.05E-03 |
| $^{239}Pu$ | 1.30E-02 |
| $^{240}Pu$ | 6.56E-03 |
| $^{241}Pu$ | 0.326 |
| $^{242}Pu$ | 1.71E-06 |
| $^{241}Am$ | 1.07E-03 |

Emergency condition depending upon the form and size of the inventory in the confinement structure and the existence of a condition that could move the material. The gallery/room CAMs could provide a key indication of a release from confinement.

### C.5.1.6 Hazardous Material Release

Two hazardous material release scenarios are summarized below. The first is a spill of a bottled chemical in one of the chemistry laboratories. The second scenario is the spill of 80 liters of 4 molar nitric acid from a tank in another laboratory.

**C.5.1.6.1 Bottled Chemical Spill.** Spills occasionally occur in chemistry laboratories. PNL-7748 selected Thionyl chloride as the bounding case for the spill of a single bottle of a potentially harmful chemical. This toxic chemical has been used in the building but was not present on the January 1994 chemical inventory list. The scenario postulates that a 1 kilogram bottle of thionyl chloride is dropped and broken against the edge of a hood. The resulting puddle evaporates completely. The calculated source term is 0.735507 grams/second or the complete evaporation of the 1 kilogram in 22.7 minutes. It is assumed that condensation and filtration do not act to reduce the vapor concentration before it leaves the building. The calculated airborne concentration at the facility boundary was 0.88 miligrams/meters$^3$ and 0.1 miligram/meter$^3$ at the site boundary. The only concentration limit parameters that have been established for this chemical is a American Conference of Governmental Industrial Hygienists (ACGIH) ceiling value of 5 mg/m$^3$ (1 ppm) and an Immediately Dangerous to Life and Health (IDLH) value of 500 ppm. The ceiling value is an alternative parameter for ERPG 2, and the IDLH value is an alternative for ERPG 3. Therefore, this spill is not a Site Area emergency since the concentration is below the ERPG 2 value at the facility boundary. Pending the development of a ERPG 1 equivalent concentration, this event would be conservatively classified as an Alert Emergency if the pungent odor caused building evacuation.

**C.5.1.6.2 Nitric Acid Tank Spill.** The second loss-of-containment chemical accident is a spill from a ruptured acid tank. The accident involves a fire or explosion in Laboratory 510. The event breaks lines or glass pipe tanks in the hood and releases 80 liters of 4 molar (22 weight/percent) nitric acid. The hood airflow is assumed to continue throughout the event; this, together with the increased temperature resulting from the initiating fire or explosion, accelerates the evaporation of nitric acid from the puddle. The source term is 0.56 grams/ second with the entire spill evaporating in 9.8 hours. It is further assumed that condensation and filtration do not act to reduce the vapor concentration before it leaves the building. The calculated concentration is 0.26 ppm at the facility boundary. This concentration is less than the criteria for an Alert Emergency, 2 ppm for nitric acid. Therefore, this accident would not be an emergency condition unless extensive outside assistance was required to mitigate and control the event.

**C.5.1.6.3 Conclusion for Chemical Accidents in the 325 Building.** The 325 Building has relatively small inventories of over a thousand chemicals. The screening process described in Section C.3 above did not identify any chemicals that would be expected to be a problem outside the facility if spilled inside the building. There is always the possibility that inadvertent mixing of chemicals would result in a product that is more toxic than any of the ingredients. However, the number of possible combinations is so large that it is difficult to bound this potential problem. The suggested approach is to have an Alert EAL tied to an adverse condition that requires facility evacuation. Some examples of conditions that could prompt an evacuation are a pungent suffocating odor in the hall or widespread reports of people with irritated eyes.

### C.5.1.7 Criticality

The fissionable materials that are received, handled, stored, and analyzed in the 325 Building can be of any type and form with varying isotopic content. The majority of the operations in the facility involve analysis of small samples of materials. The safeguards limit is currently less than 2000-g plutonium (or its equivalent) for the whole building, with an additional less than 2000-grams plutonium limit for the CEPOD process. By the nature of operations, the inventory is generally spread throughout the building with only small amounts in any given glovebox or fume hood.

The limiting criticality scenario is a glovebox criticality involving two kilograms of Pu in solution. The energy release is taken from NRC Regulatory Guide 3.35. There is an initial pulse of $1.0 \times 10^{18}$ fissions followed by 47 bursts of $1.9 \times 10^{17}$ fissions each at ten-minute intervals. The noble gas and halogen radionuclides that are released escape unhindered out the stack over an 8-hour period. Salt particles are also formed during evaporation of the solution. The salt particles release out the stack is mitigated by two HEPA filters. The source term for the first two hours of this event is shown in Table C.17. Section B.9 in PNL-7748 provides the details of the calculation.

Experience has shown that the radiation dose from an unshielded criticality would likely be fatal to anyone within 25 feet of the event. The facility boundary (100 meters) individual is assumed to remain within 100 meters of the building for 2 hours after the first burst. The calculated dose from inhalation and submersion is 9.3 rem to the facility boundary individual. The calculated inhalation and submersion site boundary dose is 1.6 rem. In addition, the direct radiation dose is calculated to be 14.1 rem at 100 meters if someone remains stationary at this distance for two hours. These doses place this event in the General Emergency category.

The Hanford policy is to classify a near criticality as an Alert Emergency and an actual criticality as at least a Site Area Emergency (unless the calculated consequences put the actual criticality in the General Emergency category). A near criticality is an event where the safety margin is known to be lost and the potential for a criticality is high. The Alert classification for this situation is based upon the general criteria that an Alert Emergency Level should be declared when events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety. A near or actual criticality will require worker evacuation and access restrictions. Resources outside the facility will be

Table C.17. Source Term for Glovebox Criticality

| Nuclide | Ci |
|---|---|
| $^{83m}Kr$ | 3.4E+01 |
| $^{85m}Kr$ | 2.2E+01 |
| $^{85}Kr$ | 2.5E-04 |
| $^{87}Kr$ | 1.3E+02 |
| $^{88}Kr$ | 7.1E+01 |
| $^{89}Kr$ | 4.0E+03 |
| $^{131m}Xe$ | 3.1E-02 |
| $^{133m}Xe$ | 6.8E-01 |
| $^{133}Xe$ | 8.4E+00 |
| $^{135m}Xe$ | 1.0E+03 |
| $^{135}Xe$ | 1.3E+02 |
| $^{137}Xe$ | 1.5E+04 |
| $^{138}Xe$ | 3.4E+03 |
| $^{131}I$ | 3.4E+00 |
| $^{132}I$ | 3.7E+02 |
| $^{133}I$ | 5.0E+01 |
| $^{134}I$ | 1.3E+03 |
| $^{135}I$ | 1.4E+02 |
| $^{238}Pu$ | 3.7E-09 |
| $^{239}Pu$ | 3.7E-08 |
| $^{240}Pu$ | 7.8E-09 |
| $^{241}Pu$ | 2.0E-07 |
| $^{242}Pu$ | 1.0E-12 |
| $^{241}Am$ | 6.3E-10 |

required to control access, evaluate the situation, and recover to a safe subcritical configuration. For these reasons, activation of the emergency response organization is required whenever an unshielded, uncontrolled criticality is judged to be likely.

## C.5.2 Natural Emergencies

Seismic events, high winds/tornados, floods, ash/snow roof loading and range fires are natural phenomena with potential emergency consequences. As described in Section C.2.2.1, the 325 Building is above the PMF flood plane and the likelihood of flooding is considered to be quite low. The emergency planning for major failures of upstream dams is beyond the scope of this Hazards Assessment. The roof design is adequate to withstand ash and snow loading. A range fire that ignites the building would have the same consequences as the uncontrolled building-wide fire discussed in Section C.5.1.3.4 above. The

paragraphs below summarize the PNL-7748 analysis of the seismic and high winds events. The classification that has been adopted at Hanford for a range fire is also discussed.

### C.5.2.1 Earthquake

The site-specific seismic criteria for existing High Hazard facilities in the 300 Area is a horizontal ground acceleration of 0.1 g with appropriate response spectrum, damping values, and soil-structure interaction parameters. The probability of an event of this size is $4 \times 10^{-4}$ per year (return period of 2500 years). However, the ongoing seismic evaluation has investigated the central portion and east and west wings of the building structure and the cell structures as new, nonreactor nuclear facilities, which must meet a 0.135g horizontal acceleration with a 5000-year return period. The hot cells and many of the external walls are expected to retain their integrity during the event. However, the ventilation system and some building windows could fail. Doors could be jammed open by door frame displacements. The driving force for material to leave the building is wind coming through openings in the building. Table C.18 shows the activity released in the first 2 hours from the earthquake scenario. Section B.1 in PNL-7748 shows how the source was determined.

**Table C.18.** Source Term for Earthquake Without Fire

| Nuclide | Ci | |
|---|---|---|
| $^{3}H$ | 0.0425 | |
| $^{85}Kr$ | 66.2 | |
| **Nuclide** | **Nitrate Ci** | **Oxide Ci** |
| $^{232}Th$ | 2.23E-10 | 2.32E-06 |
| $^{238}U$ | 1.04E-08 | 4.17E-05 |
| $^{235}U$ | 5.34E-10 | 1.16E-06 |
| $^{233}U$ | 1.36E-06 | 4.68E-07 |
| $^{237}Np$ | 6.88E-07 | 2.36E-07 |
| $^{238}Pu$ | 0.002016 | 0.000772 |
| $^{239}Pu$ | 0.002047 | 0.001203 |
| $^{240}Pu$ | 0.001037 | 0.000609 |
| $^{241}Pu$ | 0.051751 | 0.030407 |
| $^{241}Am$ | 0.000877 | 0.000343 |
| $^{242}Pu$ | 2.88E-07 | 1.65E-07 |
| $^{243}Am$ | 2.09E-05 | 7.17E-06 |
| $^{244}Cm$ | 0.00313 | 0.001075 |

The calculated facility boundary dose is 2.3 rem and the offsite dose is 0.24 rem. These values put this event in the Site Area Emergency category. The calculated consequences of an earthquake followed by a fire are 94 rem at the facility boundary and 9.7 rem at the site boundary. The earthquake followed by a fire would be a General Emergency.

A major seismic event can be preceded by tremors and followed by after-shocks. The after-shocks can cause additional damage to already weakened structures. Because of these possibilities, the Hanford policy is to declare an Alert Emergency if a seismic event is felt at a High Hazard facility and some damage such as broken windows is observed. A Site Area Emergency is declared if the damage is more severe but a significant release has not occurred. Major structural or service system damage at the 325 Building is classified as a General Emergency based on the calculated consequences reported in PNL-7748 for a seismic event followed by a fire.

### C.5.2.2 High Winds/Tornado

The 325 Building was designed and built to survive an 86 mph wind with a safety factor of 2.5 based on the ultimate strength of the structural members. The building has experienced two wind storms in recent years with gust to 80 mph (1972) and 73 mph (1990) with no damage. The estimated peak credible (E-6 probability) wind is 120 mph with gust to 130 mph. The 300 area design basis wind (E-4 probability) is 90 mph. Preliminary analyses of the effect of this wind indicate that the building can withstand both windblown missiles and the pressures imposed on the upwind side. However, the suction caused by the wind could cause a failure of the members supporting the roof of the south part of the 325A annex (the part containing hot cells). The hot cells because of their structure are not expected to suffer significant damage from the failure of the roof above them. The consequences of a tornado striking the 325 Building were not analyzed in PNL-7748 since the analysis is not required by the current Hanford Site design criteria.

A graded precautionary approach is recommended for high winds at the 325 Building. An Alert Emergency should be declared if sustained 300 area winds exceed 90 mph or 325 Building damage from high winds is observed. PNL-7748 concludes that some building damage is expected for a 90 mph wind speed. The Alert classification is based on a potential or actual degradation of the level of safety at the facility.

A General Emergency should be declared if substantial 325 Building damage and/or disruption of service systems occurs due to high winds, tornado or other phenomena. The analysis of a seismic event shows that a significant offsite radiation dose can occur if building integrity is not maintained.

### C.5.2.3 Range Fire

The Hanford Site is in a semiarid region with sagebrush and grasses growing between areas. Range fires periodically occur and can sweep over large regions before they are controlled. The summer months are historically the most likely time for a large fire to occur because of the combustible condition of the cheatgrass and bunchgrasses.

The 325 Building would probably not be the first building in the 300 Area affected by a range fire since it is surrounded by other buildings, roads and parking lots. A range fire that threatens the 300 Area

is an Alert Emergency based on the potential degradation of safety at facilities that contain hazardous material. An actual fire at the 325 Building would be classified per the discussion in Section C.5.1.3 above.

## C.5.3 Security Contingencies

DOE Order 5500.3A specifies that the facility hazards assessment shall consider the broad range of emergency events that could affect the facility. These events may result from hostile attack, terrorism, sabotage, or malevolent acts as well as the more traditional accidents and natural phenomena covered in a SAR. Closely related DOE Order 5630.3 requires a graded assessment of radiological and toxicological sabotage vulnerability. Events of this type are not within the scope of a SAR. A document called a Vulnerability Analysis (VA) has been written for some Hanford facilities to characterize the risk from these events and the effectiveness of security measures to detect and prevent the events. The VA is usually classified since it discusses security systems and could be useful to someone that wishes to damage the facility. The paragraphs below are not from a 325 Building VA. Instead, they reflect the general Hanford emergency preparedness policy toward events of this type and the potential for onsite and offsite significant consequences.

### C.5.3.1 Explosive Device

A presence of an explosive device in a High Hazard facility such as the 325 Building is classified as an Alert emergency. Activation of the emergency response organization will assist in building evacuation and access control. Furthermore, activation of the emergency response organization when the device is found will speed the response if the device detonates. A confirmed detonation of an explosive device near any of the locations that contain hazardous material is classified as a General Emergency. The analysis of a building breach explosion shows offsite dose values over a rem for an explosion in the 325 Building.

### C.5.3.2 Sabotage

Confirmed physical damage from sabotage to any safety system within the 325 Building is classified as an Alert Emergency since the level of safety has been degraded and there could be additional damage that has not yet been discovered. Any release that occurs due to sabotage is classified based on the known or potential severity of the release.

### C.5.3.3 Hostage Situation/Armed Intruder

A confirmed hostage situation or armed intruder within the 300 Area is classified as an Alert emergency since the perpetrator(s) could attempt to damage a facility. Furthermore, the resources of the emergency response organization will be useful in controlling access to the area and identifying and assessing potential damage scenarios. The emergency classification should be upgraded to a Site Area Emergency if the armed intruder(s) are located in areas that have control over large inventories of

hazardous materials. For example, the 325 Building hot cell operating galleries or laboratories that contain plutonium. Any release that occurs from the action of intruders should be classified based on the known or potential severity of the release.

### C.5.3.4 Aircraft Crash

PNL-7748 concluded that the probability of an accidental aircraft crash hitting the 325 Building is less than 1.0E-6 per year. As a result, the consequences of the crash were not analyzed. This low probability is based on an evaluation that considers the area of the building, distance from the local airports and number of flights per day at the local airports. The Hanford Site contains many facilities with a much larger total area. Whereas the probability of hitting a specific facility may be in the incredible category, the probability of hitting some Hanford facility is not incredible. Furthermore, malevolent events were not included in PNL-7748. For these reasons, the classification of an aircraft crash should be included in emergency procedures.

The range of possible releases from an aircraft crash or missile is quite large. A small aircraft crash near the facility may not release any material whereas a direct hit from a commercial jet liner could cause extensive damage to the facility and a large release. The suggested approach is to classify any aircraft crash near or at the facility as an Alert emergency. If extensive damage or a large fire is caused by the crash, the emergency would be classified based on the loss of confinement or fire EALs.

### C.5.3.5 Stack Release

Most of the air from the 325 Building exits the building through a 16.8-meters (55-feet) tall exhaust stack. The stack has record samplers for alpha particulate, beta/gamma particulate, $^{131}I$ and tritium and monitors for alpha particulate, beta/gamma particulate and $^{131}I$. The system will alarm in several locations on high activity.

The paragraphs below compare the release size to reach an Alert Level emergency with the release size that will trigger an alarm.

The criteria for an Alert emergency is a committed dose equivalent of 100 mrem at the facility boundary. The facility boundary for purposes of the calculation is 100 m east. The calculation is based on $^{90}Sr$ for beta/gamma activity and $^{239}Pu$ for alpha activity. These isotopes give the highest dose per curie released for alpha and beta emitting isotopes in the 325 Building inventory. In both cases, the majority of the dose is from inhalation.

The dose from inhalation is calculated using the following equation:

$$H = B \times Q\left(\frac{E}{Q}\right) \times C \qquad \text{(C.1)}$$

where H = committed inhalation dose (rem)
B = breathing rate ($m^3/s$)
E/Q = short term normalized time-integrated air concentration ($s/m^3$)
C = dose conversion factor (rem/Ci)

The following data was used in the calculation:

- B = 1.2 $m^3/hr$ = 3.33 x $10^{-4}$ $m^3/s$ (From ICRP 23 for light activity)
- E/Q = 1.2 x $10^{-3}$ $s/m^3$ (From PNL-7748 Section B.2.2.7 at 100 m)
- H = 0.1 rem (Criteria for an Alert emergency)

**Inhalation Dose Conversion Factors**
**Adult 50 Year Dose Equivalents from ICRP Publication 56 (1989)**

| Isotope | mSv/Bq | Rem/Ci |
|---|---|---|
| $^{90}Sr$ | 6.0E-05 | 2.2E+05 |
| $^{239}Pu$ | 0.12 | 4.4E+08 |
| $^{131}I$ | 8.2E-05 | 3.0E+05 |

The following release amounts were calculated for an Alert emergency.

| Isotope | Release (Ci) |
|---|---|
| $^{90}Sr$ | 1.1 |
| $^{239}Pu$ | 5.7 x $10^{-4}$ |
| $^{131}I$ | 0.83 |

These release amounts are based on an airborne concentration that gives an inhalation committed effective dose of 100 mrem at the maximum location. This is the criteria for the lowest level emergency classification. Much smaller releases would be an environmental contamination concern and may exceed discharge permit and reporting levels.

The stack monitor reads in counts per minute (cpm) for all isotopes. The monitor reading equivalent to the "Alert" release is calculated using a stack flow rate of 130,000 cfm, a sample flow rate of 1.5 cfm and a detector efficiency of 20% for beta particles, 10% for alpha particles and 6% for I-131 (Table C.19).

The monitor readings for an alert level release are off-scale high for the beta/gamma and alpha monitors and orders of magnitude higher than the normal background and alarm levels for all isotopes as shown in Table C.20.

**Table C.19.** Release Size for an Alert Level Emergency

| Isotope | Release (Ci) | Count Rate (Cpm) |
|---|---|---|
| $^{90}Sr$ | 1.1 | 5.6E+06 |
| $^{239}Pu$ | 5.7E-04 | 1.5E+03 |
| $^{131}I$ | 0.83 | 1.3E+06 |

**Table C.20.** 325 Building Stack Monitor

| Isotope | Alert Reading | Alarm Set Point | Typical Background | Full Scale Reading |
|---|---|---|---|---|
| $^{90}Sr$ | 5,600,000 cpm | 40,000 cpm | 100 cpm | 100,000 cpm |
| $^{239}Pu$ | 1,500 cpm | 40 cpm | 6 cpm | 10,000 cpm |
| $^{131}I$ | 1,300,000 cpm | 10,000 cpm | 100 cpm | 100,000 cpm |

Immediate declaration of an emergency condition based solely on the stack alarm with no other indication of a problem is not required since the alarm levels are far below the emergency levels of concern. A preliminary investigation should be conducted first to determine if the alarm is valid. The first step in the investigation is to observe the indicator and chart recorder. A spike is most likely caused by an instrument problem and not a significant release. A steadily increasing count rate to above the alarm level with no indication of an instrument malfunction, however, indicates a probable release. It is suggested that an Alert emergency be declared if the alarm appears to be valid and the level continues to increase to near a full scale reading for the Beta/gamma and iodine monitors and 1,500 cpm for the alpha particulate monitor. It is suggested that the Alert Emergency Action Levels for beta/gamma particulate and iodine monitor readings be set near the top of the instrument scale (90,000 cpm) since the calculated values that correspond to an Alert are off-scale high with the present instrumentation.

## C.6 Event Consequences

### C.6.1 Calculation Models

Consequences of the events and conditions identified in Section C.5 were taken directly from SAR-7748. The GENII program (Napier 1988) was used for radiological dose calculations.

The GENII program was developed by the Battelle Pacific Northwest National Laboratory to provide a state-of-the-art, technically peer-reviewed, documented set of programs for calculating radiation doses from radionuclides released to the environment. The program includes the capability to calculate radiation doses for acute releases, with options for annual dose, committed dose, and accumulated dose; for calculating the same types of doses from chronic releases; for evaluating exposure pathways including direct exposure via water (swimming, boating, and fishing), soil (surface and buried sources), air (semi-

infinite cloud and finite cloud geometries), inhalation pathways, and ingestion pathways. The various options used for the analyses reported in this document are described below.

1. Radiological releases were estimated for periods of 2 hours during and after the event. This period was assumed to be the maximum duration of exposure onsite and at the fence line, based on conservative response times for the site emergency preparedness program.

2. The facility boundary dose is calculated at 100 meters due north, the location of the minimum 95th percentile dispersion (hence maximum concentration) for that distance. The 95th percentile site boundary doses are calculated 580 meters due east. The 95th percentile values were calculated with the 300 Area joint frequency file based on data from the years 1983 to 1987.

3. All releases were assumed to be ground level and building wake was included. A building area of 600-meters$^2$ was used in the wake calculation.

4. The types of doses considered were inhalation and immersion.

5. Plutonium and uranium oxide inventories were represented by lung clearance class Y. Lung clearance class W was used for plutonium and uranium in the scenarios where those radionuclides were in nitrate solution and were not exposed to heat severe enough to convert them to oxide.

### C.6.2 Comparison With the HUDU Program

The Hazards Assessment guidance document suggest using the same program that is used in the emergency centers. The Hanford Unified Dose Utility (HUDU) program is used in the centers to project the consequences of a release. HUDU uses the same dispersion algorithms as GENII but the two programs can give different dose values for the same source term. The differences stem from the greater flexibility of the GENII program. For example, lung clearance classes can be specified with GENII but not with HUDU. This can lead to a significant difference in the calculated dose value. For example, the difference between class Y and W is about 30% for $^{239}$Pu but a factor of 16 for $^{238}$U. Also, GENII has an algorithm to determine the 95th percentile meteorology condition using a historical meteorology file. The wind speed and atmospheric stability class are input in HUDU since the code was designed to use the actual observed meteorology conditions at the time of the release. For a 300 Area ground level release without building wake, "F" class stability with a 0.89 m/s wind speed closely approximates the 95th percentile meteorology with GENII. For 300 Area ground level releases with a 600-m$^2$ building wake (the conditions that apply to the 325 Building), "F" class stability and a 4.7 m/s wind speed approximate the 95% meteorology condition in GENII. Once these differences in assumed meteorology conditions and dose conversion factors are resolved, the two codes give nearly the same answers for inhalation and submersion dose, Table C.21.

Table C.21. rem/Ci for a 325 Building $^{239}Pu$ Release

| Distance | GenII | Hudu |
|---|---|---|
| 100 m | 140 rem | 150 rem |
| 580 m | 15 rem | 15 rem |

## C.7 The Emergency Planning Zone

The Emergency Planning Zone (EPZ) is an area within which special planning and preparedness efforts are warranted since the consequences of a severe accident could result in Early Severe Health Effects (ESHE). DOE Order 5500.3A endorses the Emergency Planning Zone (EPZ) concept and requires that the choice of an EPZ for each facility be based on an objective analyses of the hazards associated with the facility. The Emergency Management Guide on Hazards Assessment provides several pages of guidance on establishing the size of the EPZ. The suggested approach is to determine the emergency classification of the events analyzed in the Hazards Assessment and then base the EPZ size on the larger of a default size for each emergency class or the maximum distance that an ESHE Threshold is exceeded. A final step is to make adjustments to the area, if necessary, based on reasonableness tests in the guidance document. For example, the selected EPZ should conform to natural and jurisdictional boundaries where reasonable. The selection of the EPZ for the 325 Building based on this Hazards Assessment is described below.

### C.7.1 The Minimum EPZ Radius

Three events have been identified that have the potential to cause a General Emergency; large fire, building breach explosion and criticality. In addition, a hot cell fire could reach a general emergency if the integrity of the HEPA filters is not maintained. The EPZ size is the larger of 5 km (the default size for a general emergency) or the maximum radius for ESHE. The Emergency Management Guide Hazards Assessment document provides the following criteria for ESHEs.

- **Radiological**

| | |
|---|---|
| External or uniformly distributed internal emitters | 100 rem |
| Thyroid | 3,000 rem |
| Skin | 1,200 rem |
| Ovary | 170 rem |
| Bone Marrow | 165 rem |
| Testes | 440 rem |
| Other Organs | 550 rem |

- **Non-Radiological**

A peak concentration of the substance in air that equals or exceeds the ERPG-3 value, or equivalent.

- **Conclusion**

  All of the analyzed releases give consequences less than the ESHE criteria at the default distance of 5 km. Therefore, the EPZ for the 325 Building is a circle with a 5 km radius around the facility. One adjustment to this boundary is suggested in Section C.7.2.4 below to conform with the southern EPZ boundary for Washington Public Power Supply System (WPPSS) plant #2.

  A 5 km EPZ was recommended for the entire 300 Area to the States of Oregon, Washington, and the adjacent counties. Oregon concurred with proposed EPZs, and Washington accepted them on a interim basis. Following approval by DOE Headquarters, Benton and Franklin counties will establish geo-political boundaries.

## C.7.2 Tests of Reasonableness

The following tests of reasonableness are from the guidance document on emergency preparedness hazards assessments.

1. Are the maximum distances to PAG/ERPG-level impacts for most of the analyzed accident scenarios equal to or less than the EPZ radius selected?

   All of the analyzed accident scenarios give consequences less than the PAG criteria at the default EPZ radius of 5 km.

2. Is the selected EPZ radius large enough to provide for extending response activities outside the EPZ if conditions warrant?

   The 5 km EPZ encompasses the entire 300 area, extends across the Columbia River into Franklin county and extends South into the Richland city limits.

3. Is the EPZ radius large enough to support an effective response at and near the scene of the emergency?

   The 5 km radius encompasses the entire 300 Area, the nearest other occupied Hanford facilities and the public roads leading to the facility.

4. Does the proposed EPZ conform to natural and jurisdictional boundaries where reasonable, and are other expectations and needs of the offsite agencies likely to be met by the selected EPZ.

   There are no natural boundaries near the 5 km EPZ with which it makes sense to align any of the EPZ boundary lines. The adjacent counties will set the geo-political boundaries when the 5 Km EPZ has been approved.

5. What enhancement of the facility and site preparedness stature would be achieved by increasing the selected EPZ radius.

   The Richland Operations Office and Hanford contractors have longstanding relationships and mutual aid agreements with local business, community, county and state emergency planning and response organizations. These relationships are driven by public concern about Hanford in general and the High Level Waste tanks in particular. The DOE and its contractors have a legal obligation and a strong moral commitment to protect the public and the Hanford workers. There is an open and candid dialogue about the hazards at the Hanford facilities as we currently understand them. No additional benefit in emergency preparedness stature is anticipated by increasing the size of the 325 Building EPZ.

## C.8 Emergency Classes, Protective Actions and EALs

### C.8.1 Emergency Classes

Table C.22 summarizes the emergency class for each scenario described in Section C.5.

### C.8.2 Emergency Action Levels

An ad hoc committee met in the winter of 1993 to write EAL statements based on the preliminary Hazards Assessment for the 325 Building (Marsh 1993). These statements are consistent with this updated Hazards Assessment with one exception. A hot cell fire with unfiltered release has the potential to reach a General Emergency instead of the Site Area emergency indicated in the reference. The preliminary Hazards Assessment used a filter reduction factor of 100 whereas a review of PNL-7748 indicates that a factor of 1000 was used to determine the source term for this event.

## C.9 HEARM Chapter

The Hanford Emergency Resource Manual (HEARM) provides information for use during an emergency. HEARM Provides summaries of the locations, operations, and potential accident scenarios for each facility. Several scenarios are selected to summarize the potential consequences of the event types that are applicable to the facility. The scenarios are selected to include the upper bound of worst-case conditions for each event type. The updated HEARM chapter based on this Hazards Assessment will be issued in a HEARM update.

**Table C.22.** Emergency Classification of Event Scenarios

| Event | Emergency Classification |
|---|---|
| **Fire** | |
| Hot Cell Fire(Filtered Release) | Non-emergency |
| Hot Cell Fire(unfiltered Release) | General |
| Consuming Glovebox Fire | Alert |
| Large Building Fire | General |
| **Process Explosions** | |
| Glovebox explosion | Non-emergency |
| Building Breach explosion | General |
| **Loss of Containment** | |
| Liquid Waste Cask Accident (Indoors) | Non-emergency |
| Liquid Waste Cask Spill (outdoors) | Alert |
| Complete Loss of Electrical Power | Site Area |
| Bottled Chemical Spill | Non-emergency |
| Nitric Acid Tank Spill | Non-emergency |
| **Criticality** | |
| Near Criticality | Alert |
| Actual Criticality | General |
| **Natural Disasters** | |
| Earthquake | General |
| High Winds | Alert |
| Extensive Wind/tornado damage | General |
| Range Fire that threatens 300 Area | Alert |
| **Security Events** | |
| Confirmed explosive device | Alert |
| Malevolent explosion | General |
| Sabotage to safety system | Alert |
| Hostage Situation/armed intruder | Alert |
| Aircraft Crash | Alert |
| **Stack Release** | |
| Confirmed beta/gamma near full scale | Alert |
| Confirmed iodine monitor near full scale | Alert |
| Confirmed Alpha monitor at 1,500 cpm | Alert |

## C.10 Maintenance and Review of this Hazard Assessment

The maintenance of this Hazards Assessment is the responsibility of Pacific Northwest National Laboratory. The building emergency plan including the EALs and Hazards Assessment are on an annual review cycle.

## C.11 References


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